ELECTRICAL REVIEW

FOUNDED 1872

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AUG 11 1942
DETROIT

"ABERCABE"

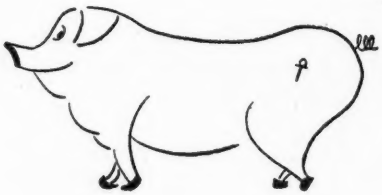
presenting compliments and thanks to those Buyers of Aberdare Cables who have responded to our appeal for empty cable drums to be returned at the earliest possible moment.

Aberdare Cables LTD.

NINETEEN WOBURN PLACE . LONDON . W.C.1

Phone : TER. 2777

Grams : ABERCABE, WESTCENT, LONDON



PIG IS A FAT ANIMAL

Its face provides Bath Chaps. I don't know if all the chaps in Bath have faces like pigs, nor do I care to go and see, in case I'm recognised. In the middle Pig is made of bacon and pork and, at the end, of ham. Behind the ham is a Pigtail which has two uses. One to hang down the backs of small girls and the other to carry current to the brushes of NECO MOTORS. Makers of some motors use Lizard tails instead because Lizard can grow another. Pig can't, but as a lot of time is wasted catching Lizard, we can give quicker delivery in spite of needing two Pigs for each motor.

THE NORMAND ELECTRICAL COMPANY LIMITED
North Street • Clapham Common • London, S.W.4
Telephone: MACaulay 3211/4

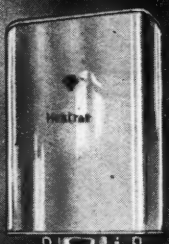
NECO

Regd. Trade Mark

E.G.B.48

HEATRAE

ELECTRIC WATER HEATERS



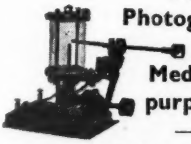
In an ever-changing world, "Heatrae" reputation for outstanding design in Electric Water Heaters remains, and will always remain, an unalterable fact.

HEATRAE LTD NORWICH · GRAMS "HEATRAE" NORWICH · PHONE: NORWICH 25131

Sole Manufacturers of

"WESTMINSTER" ARC LAMPS

For Photography and Medical purposes



MAKERS OF—

Electric Welding Machines and Patent Scaling Machines.

Spot, Seam and Butt Welders.

"Westminster" Carbon Brush Holders.

"Partridge" Earthing Devices and Pressure Detectors.

Dynamos, Motors, Alternators and Transformers Rewound and Re-constructed

Telephone: Willesden 1700, 1701
Telegrams: "Regency, Phone, London"

The WESTMINSTER ENGINEERING CO. LTD.

VICTORIA ROAD, WILLESDEN JUNCTION
LONDON, N.W.10

A

THE "FACILE" TERMINAL

Send for Prices and List of all kinds of Terminals

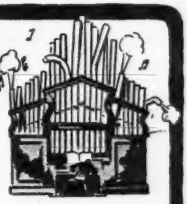
ROSS COURTNEY & CO LTD.

ASHBROOK ROAD, LONDON, N.19

TUBES

to the specific requirements of our customers.

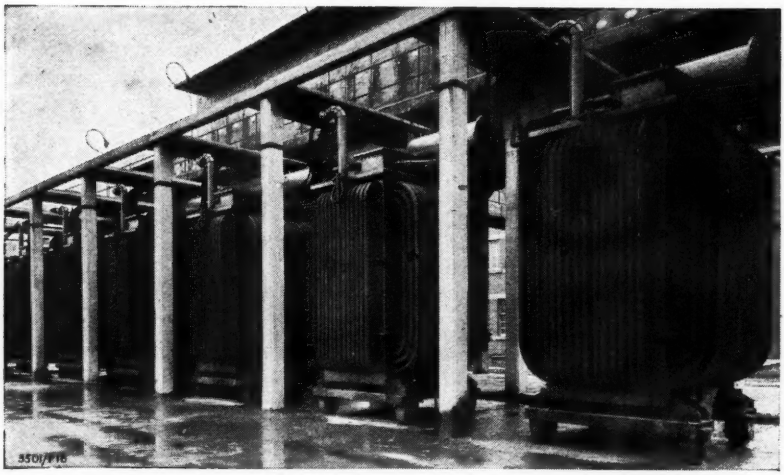
Makers of all types of repetition products from the bar in all metals.



M·C·L and REPETITION LTD. Pool Lane, Langley, Bham.

BRUSH

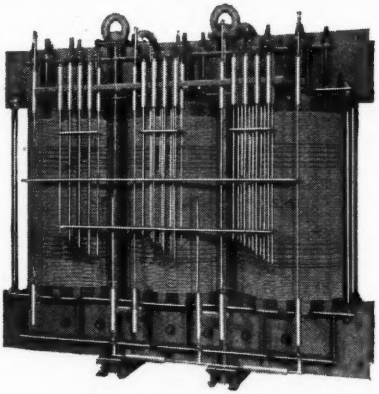
TRANSFORMERS



CONSTRUCTIONAL FEATURES
No. 5

WINDING SUPPORTS

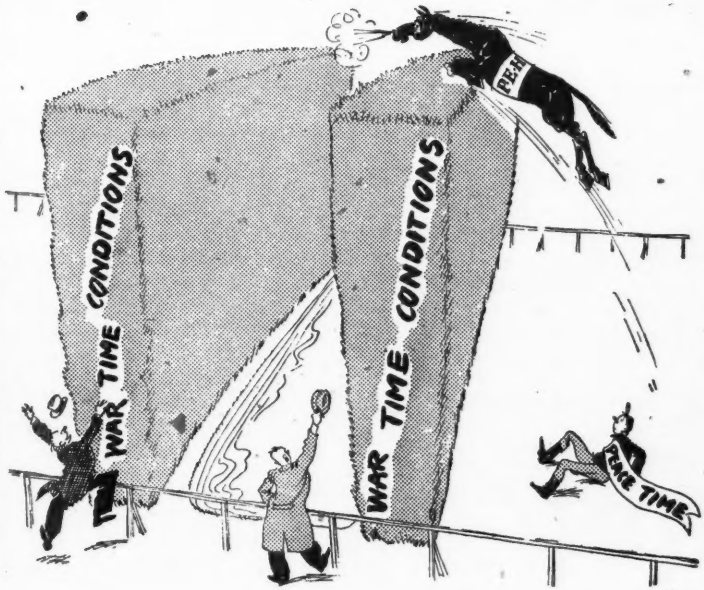
THE Windings in BRUSH Transformers are supported radially by vertical packing strips and are securely held in position axially by clamps to prevent movement or damage in the event of a severe overload or short circuit.



BRUSH Transformers can be relied upon because a Uniform Standard of excellence is maintained in every detail.

5.61

THE BRUSH ELECTRICAL ENGINEERING CO LTD
LOUGHBOROUGH ENGLAND



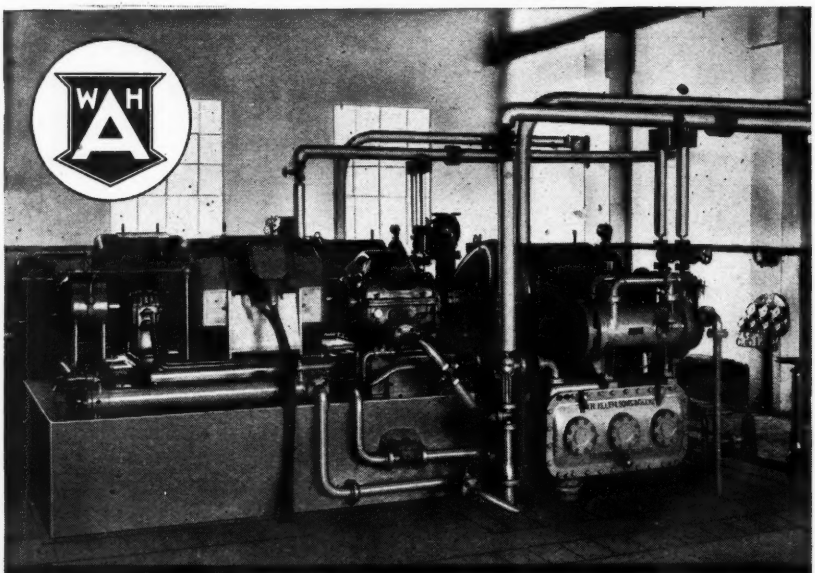
Don't think we're not trying . . .

When you call on us for a little service don't think we're not trying if we can't do just *what* you want *when* you want it. If you knew the total amount of service we are *still* giving our old friends (by way of limited supplies of apparatus and repairs) you'd probably be surprised. But the total has to cover a lot of ground these days.

PREMIER *Fine-Quality*

electric heating appliances, including the famous "Laundwell" and "Smoothwell" electric irons; "Quickset" and "Pylon" electric kettles; electric fires; toasters; coffee percolators; multi-boilers, glue-pots and other appliances.

PREMIER ELECTRIC HEATERS LIMITED · BIRMINGHAM, 9



ALLEN "AWLINWUN"

CONDENSER - TURBO - GENERATORS

Compact power units occupying the minimum space and effecting savings in building and foundation costs.

Arranged for erection on, and control from, a single floor level.

High operating economy and low maintenance charges.

Designed to meet any steam and exhaust conditions.

Arrangement can be used for straight condensing, pass-out or mixed pressure turbines.

The illustration above shows

Two 400 kW "Awlinwun" Condenser - Turbo - Alternators in a Transvaal (S.A.) Municipal Power Station.

Each set is provided with tandem vertical spindle circulating water and condensate extraction pumps driven through bevel gearing off the steam end of the main turbine shaft. The steam jet air pump is mounted above the condenser water box, and the condenser with its auxiliaries forms therefore a very compact arrangement, the condenser shell itself acting as the baseplate for the turbine.

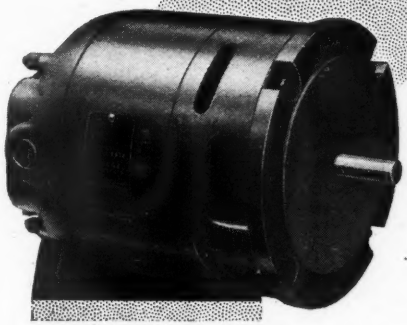
W. H. ALLEN, SONS & CO., LTD., BEDFORD, ENGLAND

B T-H

FRACTIONAL HORSEPOWER MOTORS

The most popular in the country

Spigoted Endshields



Spigoted or Plain Endshields for direct mounting on the machine

• •

BTH products include all kinds of electric plant and equipment ; and Mazda, Mercra, and Sodra lamps

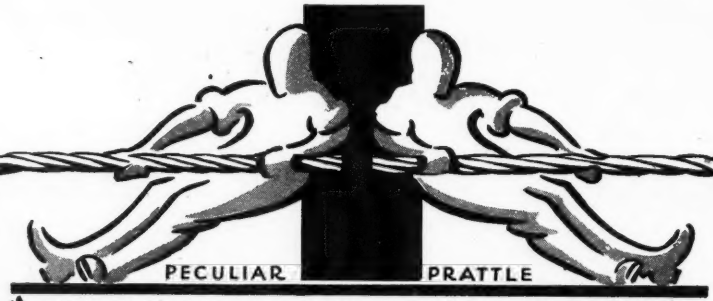
Vertical, Horizontal, or Inclined Mounting

Sizes from ¼ H.P. to 1 H.P.
Three-phase up to 550 volts
Single-phase up to 250 volts
D.C. up to 520 volts

BTH

THE BRITISH THOMSON-HOUSTON CO., LTD.
CROWN HOUSE, ALDWYCH, LONDON, W.C.2.

A3144



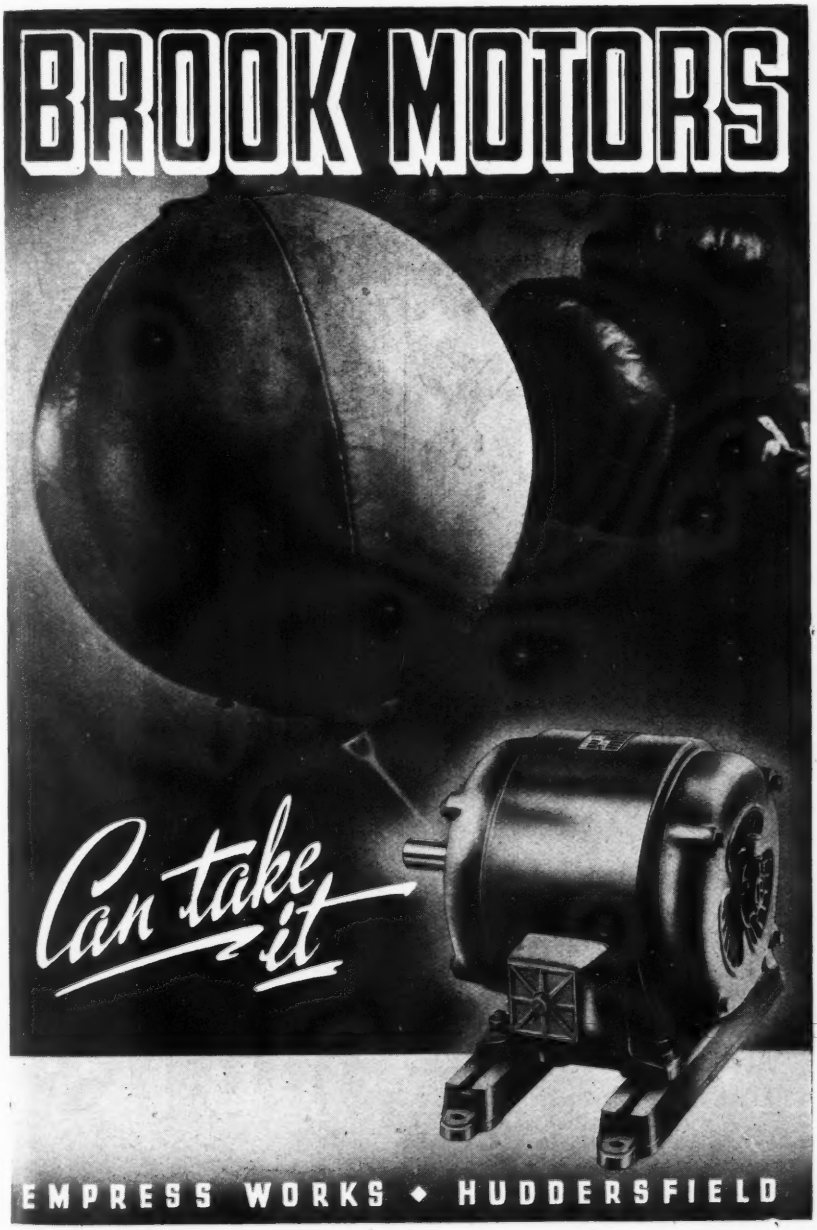
"MAKING BOTH ENDS MEET"

In plain English—not too much, or too little, but just enough (although, in these days especially, it often happens that just as you are about to make both ends meet, somebody moves the ends !).

With our huge manufacturing resources and with works throughout Great Britain, we are determined that Industry shall be supplied with sufficient of our products—Wire, Wire Ropes and Hemp Cordage—to make " both ends meet ".

British Ropes Limited

HEAD OFFICE · DONCASTER WORKS THROUGHOUT GREAT BRITAIN


BROOK MOTORS
Can take it
EMPRESS WORKS ◆ HUDDERSFIELD

BETTER LIGHTING
MEANS
GREATER OUTPUT

D & G GIRDER FITTING

FOR MACHINE TOOL AND BENCH LIGHTING

- Universal movement
- Concentration of light on the job
- Protects operators' eyes from glare
- Lower consumption
- Less lamp breakages

Made in Single-, Two- and Three-arm Extensions

Adopted by many of the Armament and other War Production firms

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Telephone : TEMple Bar 3993

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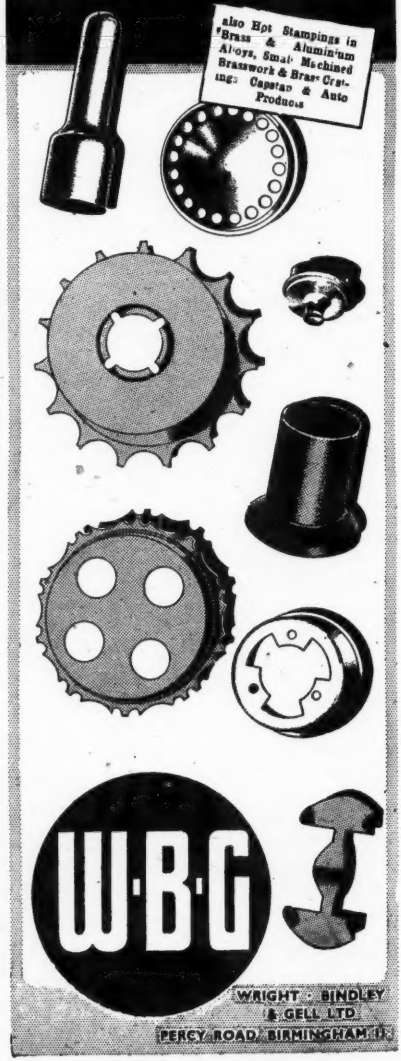
Midland Representative:
W. T. BOWER, 184 Lockey Road, Sutton Coldfield

PRESSWORK IN ALL METALS

also Hot Stampings in Brass & Aluminium Alloys, Small Machined Brasswork & Brass Crating: Capstan & Auto Products



W·B·G

WRIGHT · BINDLEY & GELL LTD
PERCY ROAD, BIRMINGHAM 18

Power obtainable at any point with this box!

- For use with V.I.R. Cables in conduit systems.
- Assembly comprises conduit chamber and detachable fused tee box.
- Conduit chambers can be inserted into the run of conduit in any position to suit machine shop layouts.
- Tee box provides fuse protection for individual machines.
- Installation is simple and economical.
- Write for full particulars of the

B.I. DETACHABLE FUSED TEE BOX

Patent applied for.

BRITISH INSULATED CABLES LTD.

Head Office — PRESCOT — LANCS. Tel No: PRESCOT 6571

HOLOPHANE FLAMEPROOF FITTINGS

These robust units are made in accordance with Buxton certificates, and incorporate Holophane Glassware which ensures an efficient distribution of the light.

Pendant fittings available for lamps up to 300 watt besides bulkhead types

These fittings are on display and their application can be discussed at:—

HOLOPHANE LTD., ELVERTON STREET, LONDON, S.W.1

Telephone: Victoria 8062 (4 lines).

Clip-on

FOR EASY CURRENT MEASUREMENTS

in Busbars, Fuses and Cables up to 2⅜" diam.

- **DUAL RANGE WITH SELECTOR SWITCH**
- **FULLY INSULATED CORE & HANDLE**

RANGES:

0 - 10 - 50 Amps.
0 - 20 - 100 Amps.
0 - 50 - 250 Amps.
0 - 100 - 500 Amps.
0 - 200 - 1000 Amps.

QUICK CHANGE TO NEW RANGE

FL50

FERRANTI

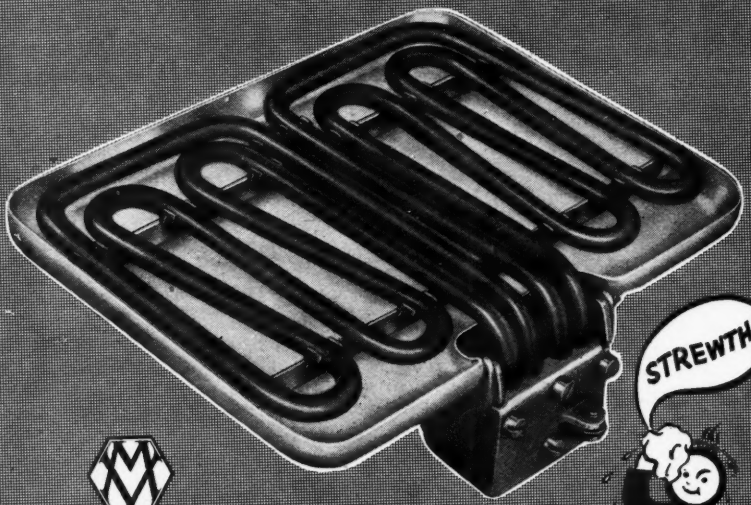
DUAL RANGE

Clip-on AMMETER

FERRANTI LTD., Hollinwood, LANCS. *London Office: Bush House, Aldwych, W.C.2.*

Metrovick

Radiant



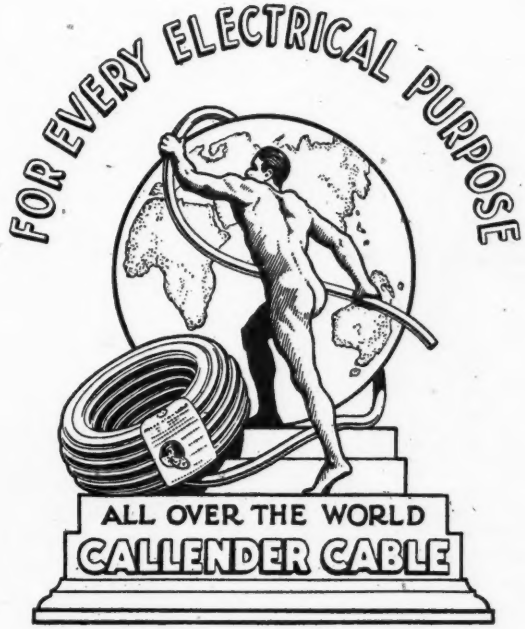
STREWTH!

RED RING

BOILING PLATES

METROPOLITAN-VICKERS ELECTRICAL CO. LTD.

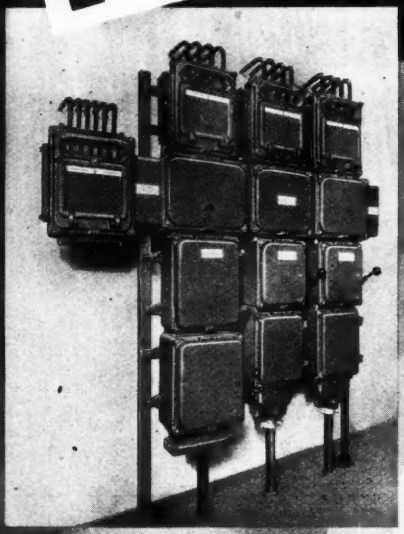
TRAFFORD PARK . . . . . MANCHESTER 17



CALLENDER'S CABLE & CONSTRUCTION CO. LTD. HAMILTON HOUSE, VICTORIA EMBANKMENT, E.C.4

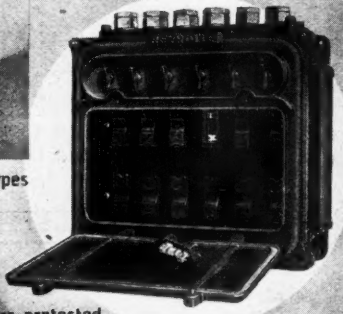
Branches throughout the World

UNIT-TYPE METAL-CLAD DISTRIBUTION GEAR

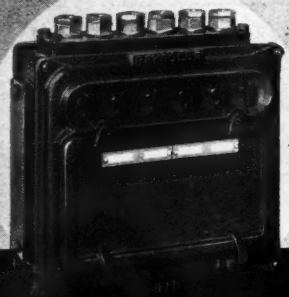


EXTENSIBLE UNITS FOR LIGHTING AND SMALL-POWER DISTRIBUTION

★ 20 amperes at 250 Volts per circuit



★ Bus-bars protected with insulating shields.



Standard 4-way and 6-way units can be bolted together to give any number of ways

REYROLLE

HEBBURN-ON-TYNE . . . ENGLAND

ROLLING HOME!

HAVE you ever seen a windjammer rolling home? It is a lovely sight, seldom seen in these days of mechanisation!

Another sight, even lovelier to us—at the moment—is the "rolling home" of our Cable drums.

Will you, metaphorically speaking, put your shoulder to the wheel and send those Drums "rolling home" to our Works? We need them badly!

The ENFIELD Cable Works Ltd

VICTORIA HOUSE, SOUTHAMPTON ROW, LONDON, W.C.1

Telephone :—Holborn 0591 (4 lines.) Telegrams :—"ENFELCAMA, PHONE, LONDON"

A New Portable Field Telephone

THIS portable telephone set provides a convenient means of communication in the field for either speech or telegraphy, according to the need.

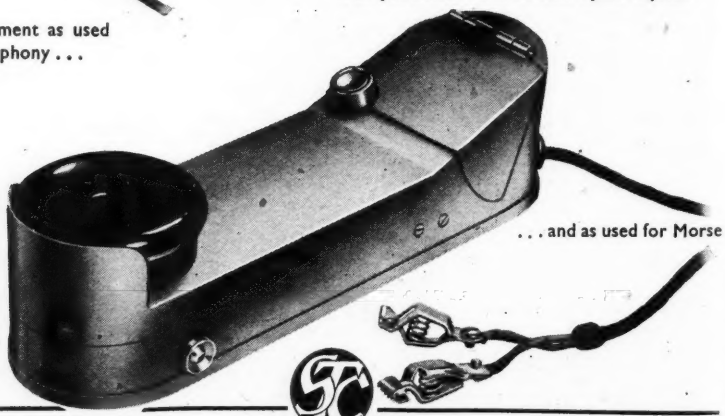
Completely self-contained, it houses a standard 4½ volt flashlamp type battery, but should it be found at any time that such a battery is not available, the instrument can be connected to an external battery by a cord located within the set for this purpose.

Under normal conditions the set can be used for speech over a distance of 5 miles while morse signals can be transmitted over greater distances.

Two wires only are necessary, or the set works perfectly on a single line and earth circuit.

Full particulars will be sent upon request

The instrument as used for telephony . . .



. . . and as used for Morse

Standard Telephones and Cables Limited

CONNAUGHT HOUSE · ALDWYCH · LONDON, W.C.2

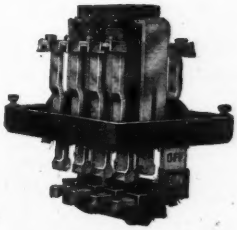
Telephone : Holborn 8765

CRABTREE AUTOMATIC CONTROL GEAR

Type "D.L." Switches

The units which comprise the Crabtree range of triple-pole, oil-immersed, Direct-on-Line automatic protective switches are constructed from a minimum number of components, thus reducing maintenance to almost negligible proportions. And each component is manufactured and assembled with that degree of accuracy which has made "Crabtree" a household name among discerning engineers the world over.

Crabtree Type "D.L." switches are designed for direct or remote control of single-phase, two-phase three-wire, and three-phase three- and four-wire A.C. circuits of up to 25 amperes. The various patterns include units with or without overload protection, suitable for mounting direct to hollow panels or machine castings; and with alternative facilities for conduit entry, H.R.C. fusing, and isolation, either separately or combined within a single case.



Basic interior of a Type "D.L." unit, clearly showing substantial contacts and visual indicator panels

This advertisement does not imply that the products mentioned are necessarily available either in the United Kingdom or for export to any country overseas.

CRABTREE

A NAME SYNONYMOUS WITH PROGRESS IN ACCESSORIES AND SWITCHGEAR

"Crabtree" (Registered) C547/134 *Advt. of J. A. Crabtree & Co. Ltd., Walsall, England*

NEVILLE'S

SPECIALISTS

in the design and manufacture of
COIL WINDING MACHINES
TAPING MACHINES
WIRE COVERING MACHINES
ARMATURE AND STATOR COIL WINDERS

AND SIMILAR SPECIALISED MACHINERY FOR THE ELECTRICAL AND ALLIED INDUSTRIES

Contractors to the Admiralty and other Government Departments

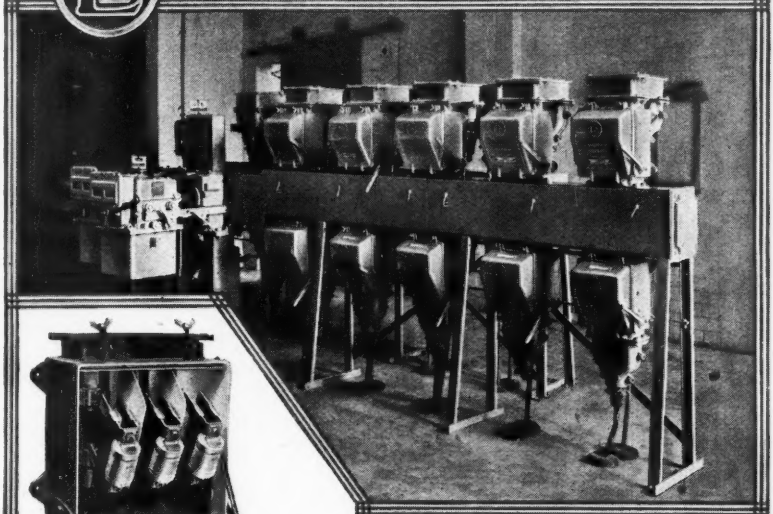
NEVILLE'S (LIVERPOOL) LIMITED

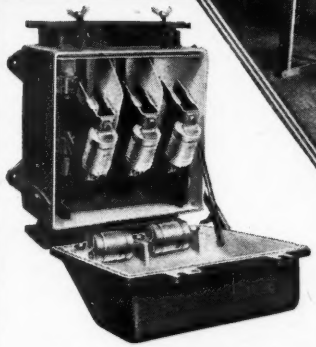
SIMMONDS TOWER · GREAT WEST ROAD · LONDON

Please address all enquiries to Western Office:
City House, St. Stephen Street, Bristol, 1.

A DIVISION OF THE SIMMONDS GROUP

FUSEGEAR





300 AMP. T.P. "COMBINATION" FUSE-SWITCH SHOWING CARTRIDGES ISOLATED FROM BOTH LINE AND LOAD CONTACTS.

Specify

DOUBLE ISOLATION

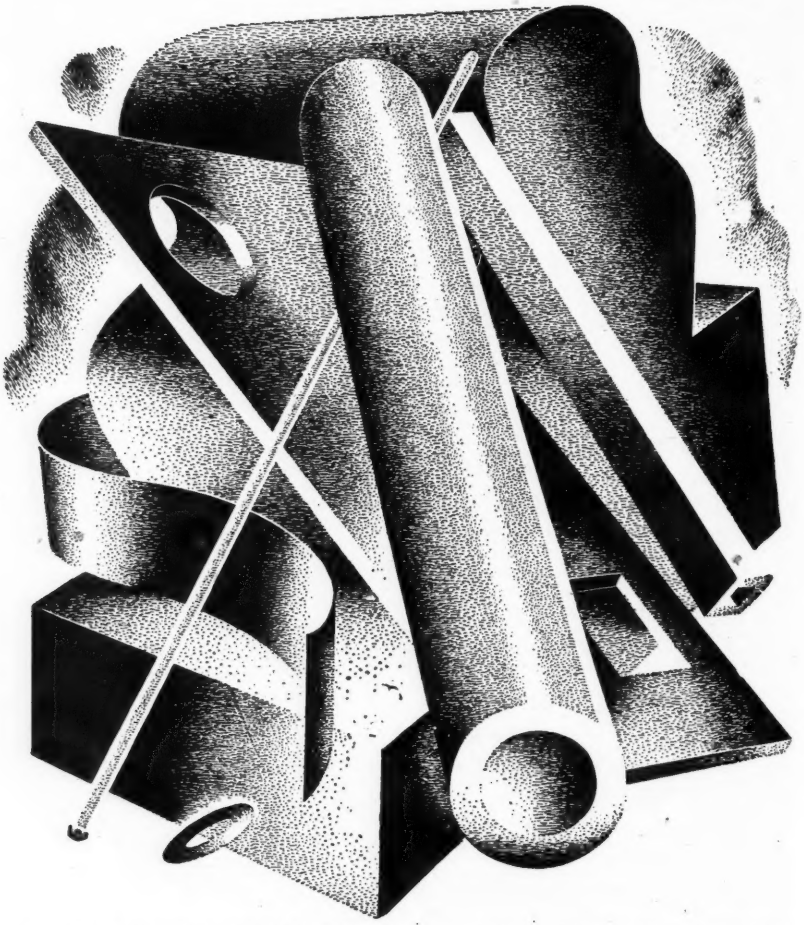
and be Safe

All 'English Electric' 'Combination' Fuse-Switch Units from 30 amps. to 750 amps. possess this valuable double isolation feature allowing cartridges to be handled with complete safety when the switch cover is **open.** They are therefore suitable for the control of inter-connector and all other types of circuits on which a 'feed-back' can be obtained under normal or emergency conditions.

Write for full particulars.

THE ENGLISH ELECTRIC COMPANY LIMITED

— STAFFORD —



BAKELITE LAMINATED, with its unique combination of physical properties, is proving its worth to-day in countless instances where vital issues depend on the quality of the equipment. It is produced in many forms by Bakelite Limited, 18 Grosvenor Gardens, London, S.W.1

TREFOIL

BAKELITE PLASTICS

REGD. TRADE MARKS

Pioneers in the Plastics World

T2a

DISTILLED WATER

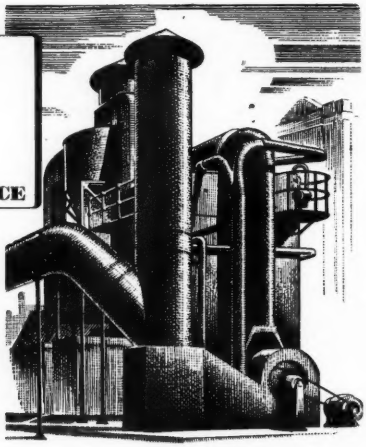
. . . has hitherto only been obtainable by "Distillation." It is possible to-day by The **Permutit** Company's new and exclusive **"Deminrolit"** process to obtain large quantities of its equivalent cheaply and simply. This revolutionary process has already found its place in World Industry and plants are in operation for varied uses including Boiler Feed. It is fully described in our Booklet:—

DISTILLED WATER WITHOUT DISTILLATION

Write for a copy to—The **PERMUTIT** Company Limited, Dept. T.W., Permutit House, London, W.4.

Telephone: CHIswick 6431 Cables: Permutit, London

Solving one Problem of **MAINTENANCE**

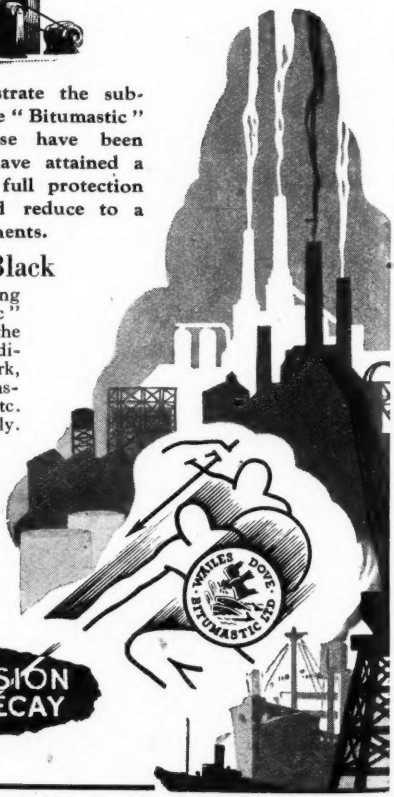


AMPLE evidence is available to demonstrate the substantial savings effected by the use of the "Bitumastic" and other Wailes Dove products. These have been developed during the last 87 years and have attained a remarkable degree of efficiency. They give full protection to metal, timber and other surfaces and reduce to a minimum the need for repairs and replacements.

"BITUMASTIC" Super Service Black

For the rough and tough jobs. Provides a coating three times as thick, coat for coat, as "Bitumastic" Solution or any ordinary protective paint. Just the thing for surfaces exposed to severe corrosive conditions. Is extensively used for structural steel work, outdoor H.T. Transformer Parks, Overhead Transmission Towers and for Accumulator Rooms, etc. Applied cold, straight out of the drum, by brush only.

Ask for this ANTI-CORROSION GUIDE.
It gives helpful guidance as to the exact Wailes Dove preparation to use for any particular surface. Surfaces are listed under headings with thumb index for quick reference. Please mention Dept. L3.



WAILES DOVE DEFEAT CORROSION ROT & DECAY

WAILES DOVE BITUMASTIC LTD., HEBBURN, CO. DURHAM
Telephone: Hebburn 32321-5

GD81/SSB

THE SHEIKH BELONGS TO EQUATORIAL CLIMES —NOT SO THE WORKER IN OUR FACTORIES.

The worker must be protected from excessive heat and bad ventilation, otherwise output suffers.

Do not allow black-out temperatures to slow down your output. Consult the G.E.C., whose ventilation engineers will give expert advice on ventilation equipment especially designed for black-out conditions.

VENTILATION BY GENALEX FANS

CONSULT THE G.E.C. ON VENTILATION with GENALEX EXHAUST FANS

Advt. of The General Electric Co Ltd., Magnet House, Kingsway, London, W.C.2.

PLAYING THEIR PART *Today*

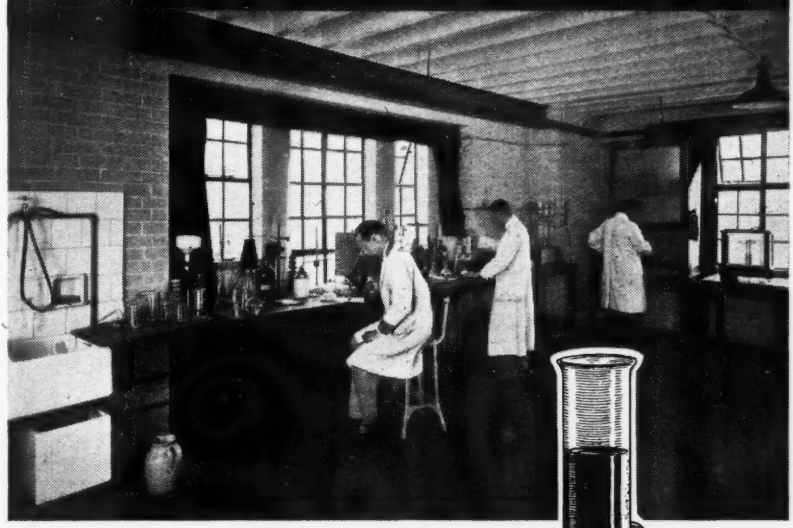
ASHTON
CABLES AND FLEXIBLES

Proving their reliability everywhere

As supplied to H.M. Government Departments and all Electrical and Allied Trades.

MADE BY
AERIALITE *Ltd.*
CASTLE WORKS · STALYBRIDGE · CHESHIRE

RUBBER RESEARCH



"Science is on the March! Research is her able ally"

Even before the momentous events preceding Malaya, the Laboratories of the Empire Rubber Company were at work on the development of rubber substitutes. When Rubber leapt into the news—when the need for economy in this important raw material became of vital consequence to the Nation, our work was already well advanced.

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We shall in many cases be able to meet your requirements, yet still continue our important duty of economising in the use of Rubber.

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Rubber Technicians for all Industries

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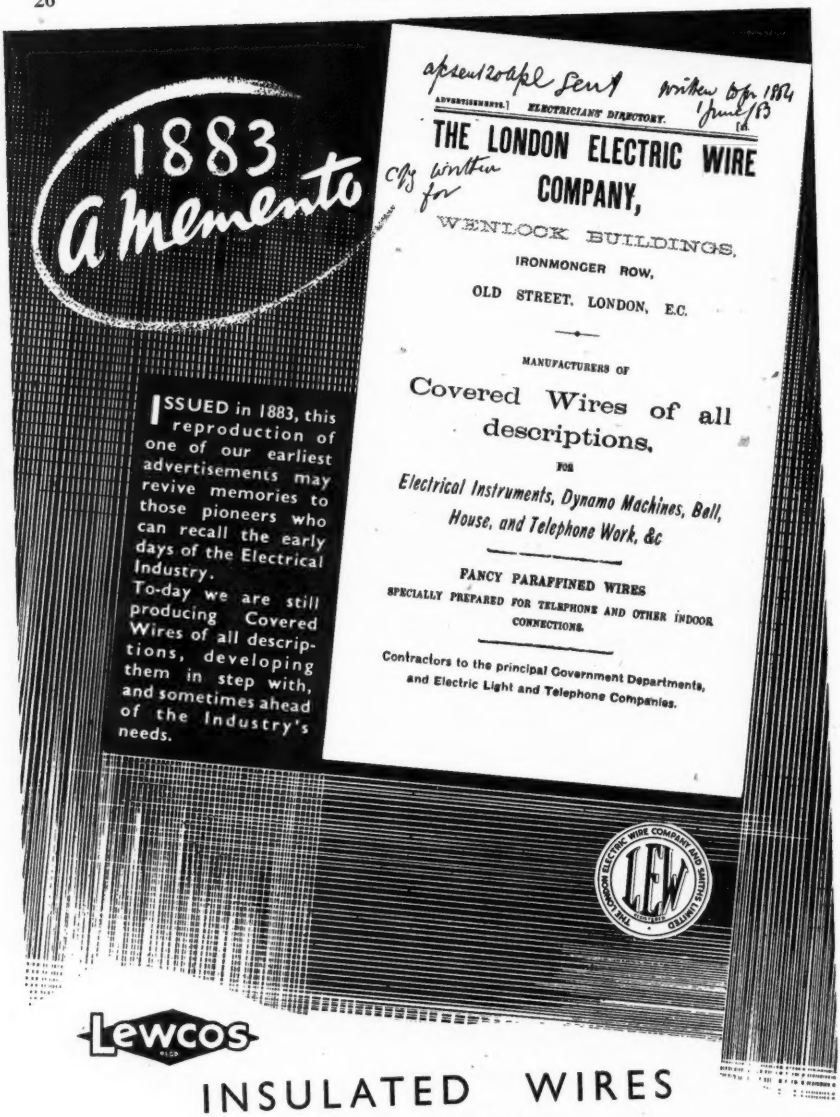
1883
a memento
ISSUED in 1883, this reproduction of one of our earliest advertisements may revive memories to those pioneers who can recall the early days of the Electrical Industry.
To-day we are still producing Covered Wires of all descriptions, developing them in step with, and sometimes ahead of the Industry's needs.
ADVERTISEMENTS.] ELECTRICIANS' DIRECTORY.
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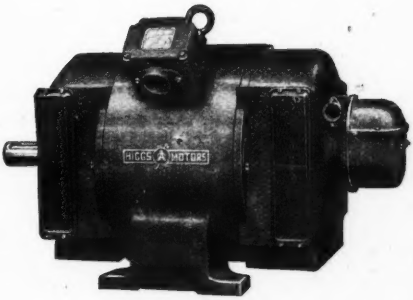

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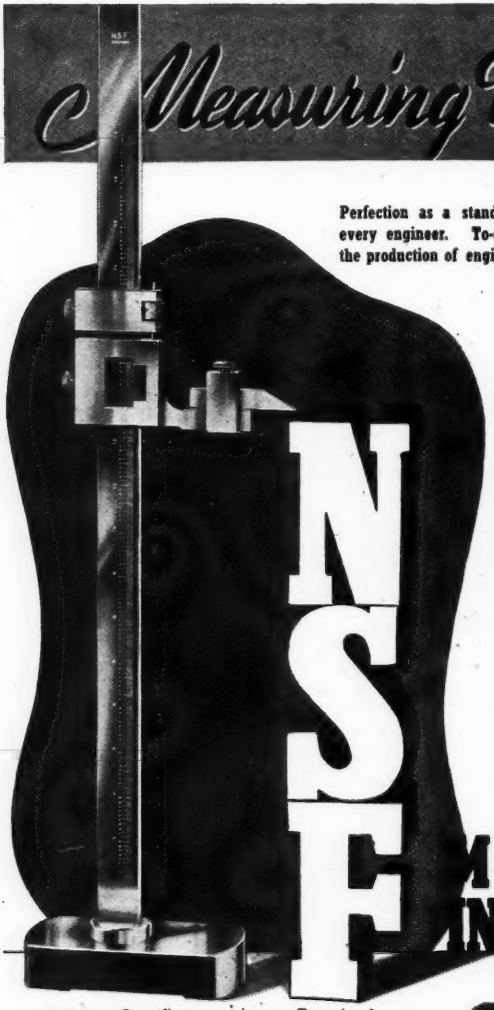

Perfection as a standard of achievement is the aim of every engineer. To-day as never before, perfection in the production of engineering equipment is a vital necessity It is a standard which if consistently sought will shape the events of to-morrow.

Just as the Spitfires and Hurricanes which cleared our skies of Hitler's hordes were the result of the designers' and manufacturers' efforts to secure perfection, so have the most important achievements in engineering throughout the ages been backed by similar ideals.

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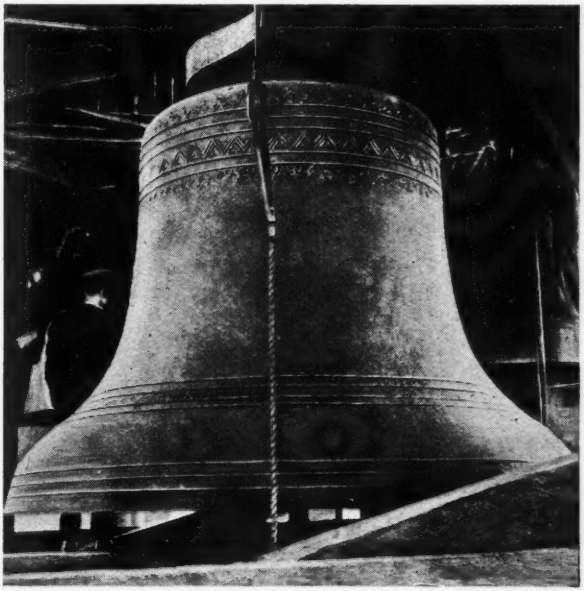
MEMORIES OF THE GREAT CRAFTSMEN



Who designed Big Ben?

Sir Edmund Beckett (afterwards Lord Grimthorpe) was both Architect and Lawyer; applied Astronomy and Horology were among his many craftsmanlike accomplishments. In 1851 he designed the great bell whose tongue now speaks majestically to the whole world.

The fact that, even before the coming of wireless, a single bell could serve a whole community of people severely limited any development of bell founding as a craft, and bells are still made in much the same form as in olden times.

The reverse is the case, of course, in other engineering crafts. For instance, the demand for electrical switchgear and appliances has resulted in a vast expansion. At the M.E.M. factory, this great task has been tackled according to the best traditions of British craftsmanship. That is to say, that, by making the fullest possible use of the modern technique of machinery and organisation, a vast output has been achieved without sacrificing quality, accuracy and fine finish. This is the new craftsmanship.

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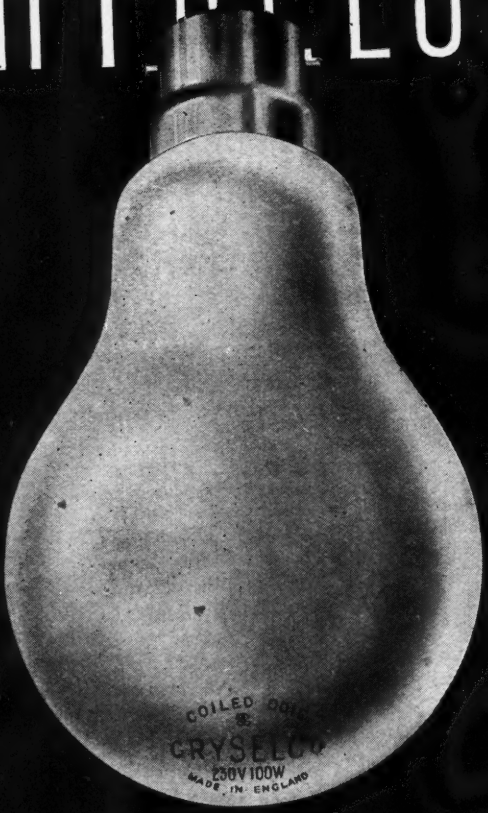

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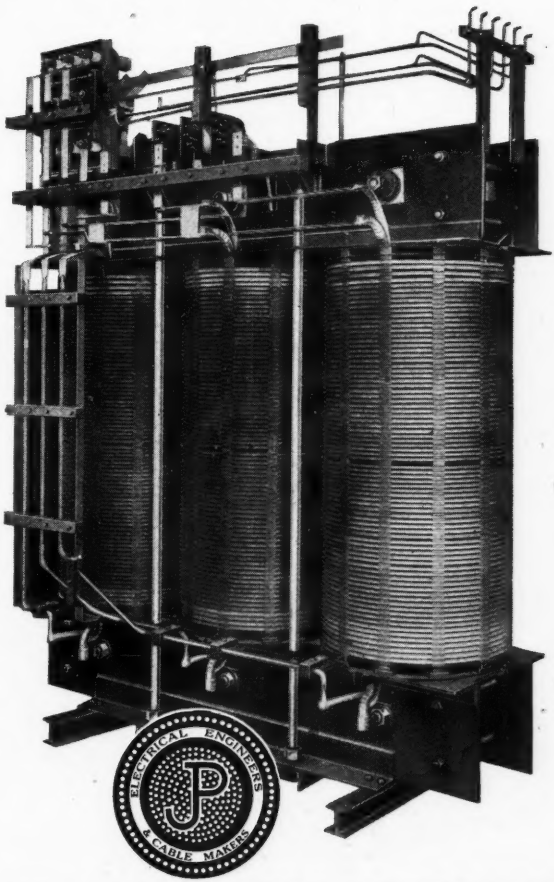

FOUR 10 MVA TRANSFORMERS

have just been completed—the voltage ratio being 33,000/11,000/6,600. The dual secondary is selected by an off-load throw-over switch. In addition, there are off-load tappings on the high-voltage side giving 2½, 5 and 7 per cent.

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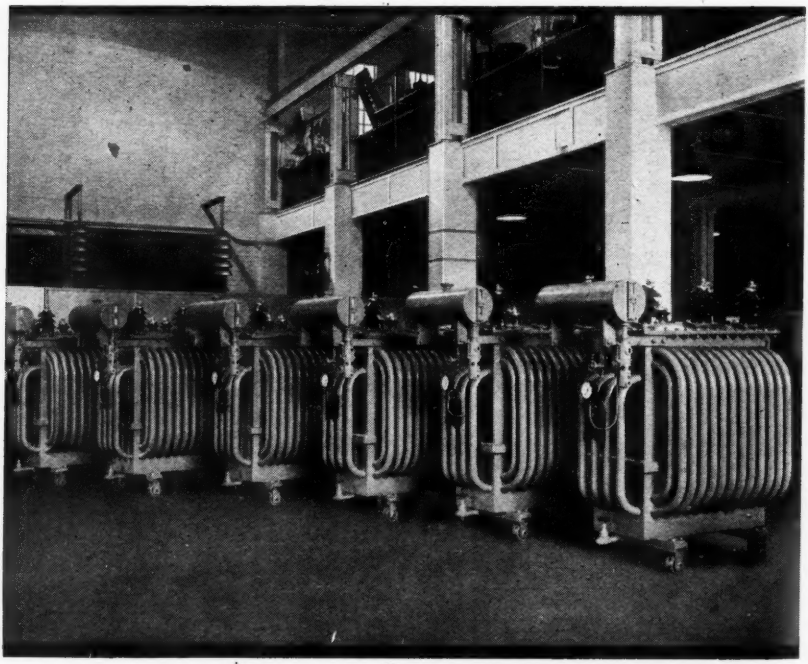

A group of Power Transformers awaiting shipment to South Africa

BRITISH POWER TRANSFORMER CO.

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Phone: Howard 1492 LIMITED Grams: "Vitrohm, Enfield"
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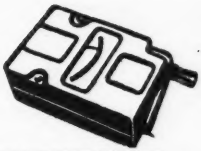
REGISTERED TRADE MARK

'MEGGER' TESTERS, made exclusively by Evershed & Vignoles Ltd., are used throughout the world for testing electrical insulation. Each tester consists of a hand-driven generator producing the desired testing voltage, and a direct reading ohmmeter.

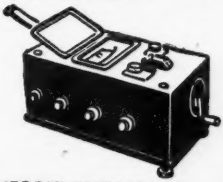


THE WEE-MEGGER TESTER

This instrument is suitable for testing house wiring, small motors, etc., operating on voltages not exceeding 250 volts. Testing pressures up to 500 volts. Ranges up to 20 megohms. Weight only 3 lb. Write for List D 208.

THE MEG INSULATION TESTER

This instrument is suitable for testing power circuits, motors, etc., operating on 500 volts, and for mains having moderate electrostatic capacity. Testing pressures up to 1,000 volts. Ranges up to 2,000 megohms. Write for List D 454.



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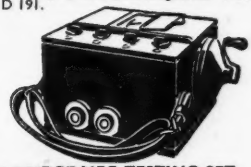
A special 5,000 volt testing set is also available, reading up to 20,000 megohms. Write for List D 191.



THE BRIDGE-MEG TESTING SET

This instrument combines a MEG Insulation Tester and complete Wheatstone Bridge. It is suitable for measuring accurately the resistance of motor windings, contactor operating coils, etc., and for the periodical testing of insulation. Testing voltages up to 1,000 volts. Range .01 ohms up to 200 megohms. Write for List D 267.

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ELECTRICAL TESTING INSTRUMENTS

Insulation Testers, Resistance Testers, Earth Testers, Switchboard and Portable Indicating and Recording Instruments, Apparatus for Remote Indication and Control, etc.

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BETTER WORK - GREATER OUTPUT
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ELECTRICAL REVIEW

Volume CXXXI **No. 3374**

Friday, July 24, 1942

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AND TO THE DAYS WHEN WE SHALL BE ABLE ONCE AGAIN TO SUPPLY

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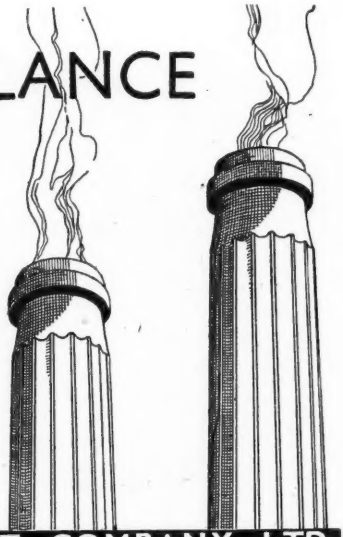

CONSERVATION of COAL

is an essential part of the war effort. Economy in the boiler house is now not only a matter of £ s. d., and it is most effectively secured by installing reliable instruments to determine the combustion conditions.

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LIST 157-X

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXXXI. No. 3374. JULY 24, 1942 6d. WEEKLY

Avoidance of Rationing

Suggestions for Economy Appeals

THE appearance of the fuel assessment forms will probably do more than anything else to persuade householders of the urgent need to reduce their consumption of coal, gas and electricity to somewhere near the limits which a rationing scheme would impose. Let us hope that this is the case and that the desirable saving will thus be achieved, although how this can be gauged before the winter we do not know. We still hold the view that fair rationing is impracticable and that voluntary economy is the only way out.

Little from Lighting

The Ministry of Fuel and Power is proceeding with its campaign. Frequent hints are being given by the B.B.C. and advertisements have begun to appear. The first of the series stressed economy in lighting and suggested the substitution of lower-wattage lamps for the existing ones. Apart from the harmful nature of this advice from the ophthalmic aspect, we think that this is a most unlikely field for saving in the domestic sphere. Already the vast majority of rooms are underlighted and in any event the suggested replacement would not achieve much. It would be far better to recommend the reduction of " listening-in " by an hour or two a day.

Emphasis should be reserved for space heating, cooking and water heating where the possibilities of waste and consequently of effecting economies are much greater. It is probable that many people unaccustomed to electric heating have bought the cheap fires which, strangely enough, have been so easily obtainable during the past few months. The very novelty of the electrical method may have encouraged excessive use and an advertisement drawing attention to the necessity for a close watch upon consumption by these heaters should have effect.

Electric cooking has its special technique which many housewives have not yet mastered. Ovens are used for small single dishes; hot plates are only half covered and unsuitable pots and pans are placed on them; grills are used as boiling plates without the necessary deflector plate in position or are used simply as grills when the top heat might be usefully employed; residual heat is wasted; and kettles are filled to the brim for the production of a cup of tea.

Fuel Saved—Money Saved

Consumers should be urged to keep an eye on their meters and meter cards and to aim at keeping their consumption during a quarter down to, say, two-thirds of that registered for the corresponding period of last year. In this connection it would be well to stress the reduction in the bill—that it pays to economise.

By these means it should be possible to bring about a very appreciable saving of coal, but the fact still remains that the greater saving necessary can only be made in other directions—in industry, commercial establishments and public buildings where the actual users are not those who pay the bill. All managements and public authorities must make it somebody's

responsibility to see that there is no waste, or, what is as bad, unreasonable use. The onus is upon them for it will be difficult to ensure that the new Order is thoroughly and effectively enforced. Detection and prosecutions under the Order can only be haphazard and the "powers of search" are distasteful, but we suppose that it is well to have the powers in reserve for use in flagrant cases of waste. All possible action should be taken to secure the economies which must be made without recourse to the rationing of domestic consumers. This would savour of penalising the more or less innocent for the guilty if the larger culprits were not curbed, and, as we have repeatedly said, would only save fuel at the price of grave hardship for many.

Making the Best of It

AT the Institute of Fuel luncheon, which we report on another page, Lord McGowan emphasised the fact that the best way to save fuel was to ensure the most efficient use. This involved proper cleaning and grading and the allocation of the appropriate fuel to the various classes of consumers. Electricity supply undertakings, who for some time have had to take the coal given to them, whether suitable for their purposes or not, will heartily concur with this sentiment. But they will derive no hope of improvement from Major Lloyd George's response. He agreed that while cleaning, grading and correct allocation were most desirable, in present circumstances it was impossible to achieve this. He put the onus of securing the greatest efficiency upon the users. If boiler house staffs can do more than they are doing at present with the material available no doubt they will, but in most cases the margin for improvement cannot be very great.

Ownership of Electricity Supply

THE war put an end to the debate upon the future ownership of electricity undertakings which was bound up with the question of the reorganisation of distribution. The matter was to be raised at a meeting of the Association of Municipal Corporations upon a report by that body's General Purposes Committee. The principal subject of the report was the future structure of local government, but it is not our immediate business to consider its general recommendations. We merely desire to place on record the view expressed by the Committee that "public utilities should, as a general statement, be owned and controlled by the public through the democratic forms of local government. In appropriate cases the system of bulk supply should exist: the function of generation (in the case of electricity and gas) or collection (in the case of water) might be separated from the function of distribution. These services may, in fact, be placed upon an approximation to a regional basis, regional in this case implying an area economical and efficient for the administration of such services."

Coal Stocks

THERE has been a tendency in some Government circles to consider that the ten or twelve weeks' stock normally held by electricity supply undertakings is somewhat excessive in a time of coal stringency. This view is an entirely wrong one having regard to the increased risk of delayed supplies during wartime and yet it has had an influence in some directions. Apparently the allocations to some important undertakings have been curtailed almost to danger point. At Manchester last week the chairman of the Electricity Committee (Councillor H. Strange) stated that the Department had less than four weeks' reserve. He said that this happened at a time when it was proposed to close mines down for a week's holiday and he suggested that the break might be postponed to a more convenient period.

U.S. Progress

SINCE restrictions on normal engineering developments and on the publication of information about them have not operated in the United States as they necessarily have here during the first two years of the war, the account given in the *I.E.E. Journal* for June of recent electrical progress in that country is of particular interest. Reports have appeared in our pages of the more important items, but it is convenient to have them brought together in the admirably concise form adopted by Mr. A. E. Knowlton, associate editor of the *Electrical World*. War conditions do, of course, come into the picture, as, for instance, in the increase of output of arc furnaces from about 1½ million tons in 1939 to more than 4 million tons last year.

Seed Preparation

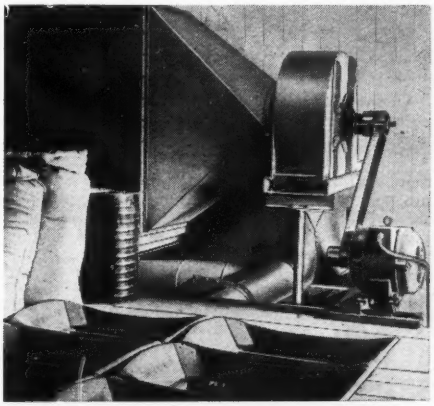
Electrical Methods Widely Adopted

NEARLY all of us are gardeners these days, but the seeds we sow are largely taken for granted and little is generally known of the great care and trouble the producers take to ensure that we get seeds which are true to type and up to germination standards. Nor is it realised to what a large extent electrically operated equipment is utilised, not only for improving the products, but also for increasing output. Nevertheless, it is true to say that without extensive use of electricity the 50 per cent. increase in output achieved this season by Edward Webb & Sons (Stourbridge), Ltd., to meet national needs would not have been possible, especially with the reduced number of workpeople now employed.

In order that we might see for ourselves the many ways in which electrical apparatus helps, Mr. W. Marshall Hartley, the works manager, recently took us for a complete tour of the works. The sample room was the first department we inspected. Here samples of seeds, most of which are grown under contract, are received, labelled and classified. No fewer than 10,000 germination and purity tests are carried out each year in the adjoining laboratories, the equipment of which includes electrically heated incubators and Copenhagen tanks (for the smaller seeds), both thermostatically controlled. Night work has been rendered possible here by the recent installation of "Mazdalux" fluorescent lighting. This form of illumination has been adopted in the general office section where a colour indexing system makes easy colour discrimination necessary. Accounting, Burroughs and Dictograph machines, and Smith clocks are other electrical aids to be found in the offices.

Throughout the works considerable care has been taken to eliminate manual work wherever possible. Seed arriving at the works is taken by means of friction hoists to the intake floor at the top of the building whence gravity feed is used to pass it from one process to another. Two of the three friction hoists installed are driven from the same 5-HP, 960-RPM, two-phase, E.C.C. motor, while the third has its own 3-HP, 960-RPM Higgs unit.

Some seed may be in a damp condition when it reaches the works. It may even have been damaged by sea water, and immediate drying is necessary to save its value and usefulness. In this case the seed is taken at once to a special drying room where the bags are placed in trays and heated air, conveyed through ducts in the floor, is blown through them. The temperature employed is usually 80/90 deg. F., and this is attained by air being drawn through a nest of water-heated pipes, the temperature of which can be controlled. The blower unit is driven by a 10-BHP, 1,425-RPM Higgs motor, and the damp air is expelled from the building by electrically driven extracting fans. Approximately fifty sacks can be dealt with at one time by this plant.



Damp seed is treated in a special drying room

Most of the main seed-cleaning machinery is grouped into sets of plant, each of which forms a complete cleaning and grading unit working independently, and each unit is driven as a group by 7½-BHP, 960-RPM Higgs motors transmitting through a countershaft. Each unit comprises a Boby double draught cleaning and grading machine, an elevator and a set of six internally indented cylinders.

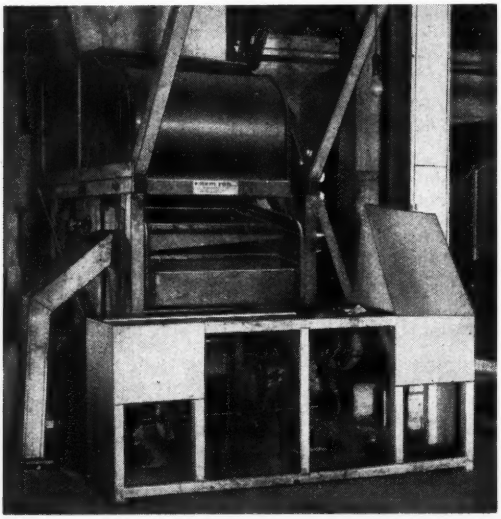
Seed is fed into the Boby machine through a hopper, the top of which is flush with the floor above that on which the machinery is situated, and it is then met by a draught which blows out all chaff, sticks, straw and other light matter. Falling through the scalping riddle, which retains and passes off all large impurities, the seed drops on to and is retained on the grading screen which allows all silt, immature seeds and other small matter to pass through it. The best seed is then blown again and leaves the machine to drop into the boot of a cup type elevator

which lifts it to the indented cylinders. These separate the seeds according to length, and will, therefore, remove wheat from oats, etc.

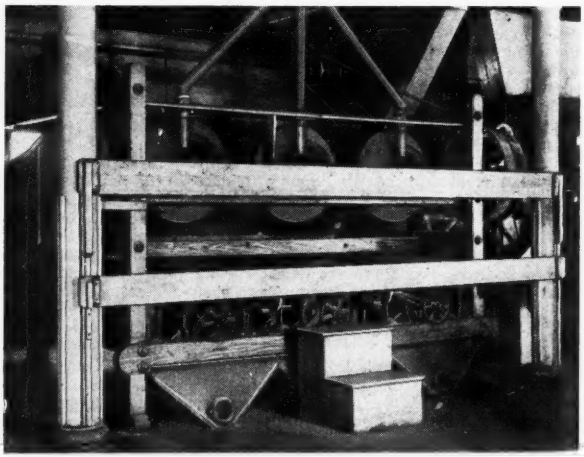
All seed grain is treated with a mercurial powder dressing as a preventive against seed-borne disease, and this process is carried out by means of a Turner dusting machine, through which the grain passes immediately on leaving the cylinders. In this machine powder is fed to the grain, which is then sacked off on the dispatch floor below. The loose powder, which is poisonous, is collected by a "Katchall" dust collector. The dusting machines are driven by Higgs geared motor units, each of 1 BHP, running at 1,425 RPM, with a shaft speed of 374 RPM, while the fan of the "Katchall" dust collector is directly coupled to a ¾-BHP, 2,800-RPM, Higgs motor.

Amongst other machines used are a Turner "Eureka" standardised separator, which employs aspiration or "sucking" instead of blowing, and the reciprocating motion is given to the screens by a "Monoplano" drive instead of the more usual crank. Dust and light matter from the fans are collected in a "Cyclone" dust collector. The driving unit employed with this machine is a 10-BHP, 730-RPM, Higgs motor. A Carter-Mayhew separator is used in conjunction with one Boby machine in place of the indented cylinders. This particular machine incorporates twenty-seven indented plates, the indentations of which gradually vary in size from one end of the machine to the other. An exceptionally high degree of discrimination is thus provided, it being possible to split off the separation at any of the twenty-seven stages, and seeds which resemble each other closely in size, such as barley and wheat, can be separated.

Sugar beet, mangold and similar "cluster" seeds are cleaned by an anti-gravity or "sticker" machine. The seed is here dropped by a roller feed on to a wide endless canvas belt, the top surface of which runs in an uphill direction. The seeds, being roughly round, roll down the incline, while sticks and other matter are carried uphill and drop over the edge of the top roller. Powder dusting of these seeds is effected by a slowly revolving drum fed directly from the "sticker" machine.



One of the Boby cleaning and grading machines



Banks of internally indented revolving cylinders separate seeds of different sizes

Small seeds are cleaned on "Dossor" machines. The action of these is similar in principle to that of the "sticker" machine, but the seed cascades down a number of endless velvet bands which run in an uphill direction: angular seeds are carried over the top, and the round seed discharges over the bottom roller of the machine.

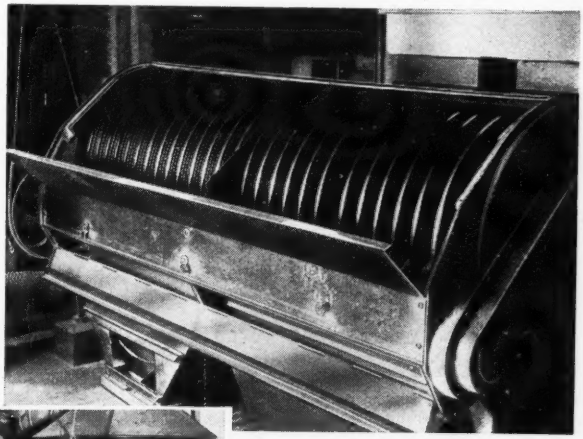
Germination of clover seeds is assisted by treating them in a "scarifier," a machine which helps to break down the very hard surface that some seeds possess. These machines which deal with small seeds are group driven from a countershaft, the power being supplied by a 5-BHP, 950-RPM Higgs motor.

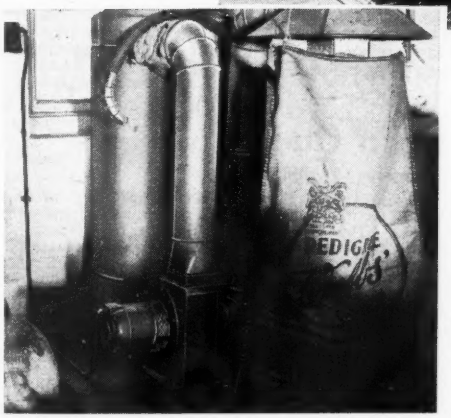
Seed peas which are slightly eaten away, but are not greatly affected either in size or weight, present a problem in cleaning which has been overcome by the installation of Simplex pea-picking machines. These machines consist of a slowly revolving cylinder, inside which are fixed at an angle small needle-like projections. Damaged seeds are caught on these and carried to the top where they are removed into a tray by a rotary brush. ¼-BHP "Metrovick" motors are used for individual drives.

The machinery described above will only separate and clean seeds according to either their size or weight. It is sometimes necessary to separate by colour, as in the case of black and white oats. This has to be done by hand. To facilitate this the daylight characteristics of fluorescent lighting have been brought into service with excellent results.

Another method of seed segregation has recently been evolved whereby the nature of the texture of the seed skin is made use of, and seeds of similar weight or size can thus be separated. In this process the seed is mixed with a certain quantity (pre-determined by laboratory test) of soft grey iron powder and water. It is then fed by means of a feed roller and shaker tray over a revolving metal drum, inside which is a strong electro-magnet so fixed that the maximum pull on the periphery of the revolving drum operates at the point where the seed would automatically drop off at a tangent.

Smooth seeds, not having collected any iron powder during the process of mixing, will drop off at this point and are collected in a hopper. Seeds which are eaten away or broken and have collected a small amount of iron powder are carried beyond this point and drop off as soon as the magnetic attraction lessens sufficiently. Weed seeds such as dodder or rib grass whose skin texture holds the iron powder, cling to the drum until they are swept off by a revolving brush at the back. Separating clover seeds with this type of machinery enables the cleaner to produce an extremely true sample with a minimum of wastage.





Above: A "Carter-Mayhew" separator gives a high degree of selectivity with its twenty-seven indented plates
Left: A "Katchall" mercurial dust collecting unit which obviates the wearing of respirators

Sacks and bags are a large item in a seed merchant's business, and their handling calls for careful planning. As soon as sacks are emptied or returns come in, they are sent immediately to the special department which deals with their cleaning, sorting and mending. The former work is undertaken partly by machinery and partly by hand, the sack being turned inside out and all dust and loose seeds removed from it by suction plant, the fan of which is driven through a "V" belt by a 7½-BHP Higgs motor. They are then brushed by hand, examined and passed either for repair or sorting. Repairs are carried out by machinists working electrically driven Singer darning machines, and tubular heaters are installed for keeping the operators warm.

The daylight characteristics of fluorescent lighting have been utilised for facilitating the separation of seeds by colour

The packeting, binning, collecting and dispatch of small seed does not offer much scope for the use of electricity, except in so far as small electrically driven conveyors can carry the seed from the packeting machines to the stocking bins. Attention has been paid to the arrangement and grouping of the lighting, and use made of elliptical shades for helping in the illumination of the stocking bins, packeting machines and other equipment.

We should like to thank the company for granting us facilities to visit the works and also Mr. Hartley for assisting us in the preparation of this article.

Electricity in Quebec

Possible Government Action

DURING the annual convention of the Canadian Electrical Association at Quebec last month Mr. McNeely DuBose, president, referred to reports that the Quebec Government was considering expropriating all electrical utilities in the province. During the latter part of April, he said, it was publicly stated that a Bill was being drafted for immediate passage through the Legislative Assembly whereby the Province of Quebec would, by expropriation, take over the management of all the electrical utilities within the borders of the Province.

The Government decided not to put this Bill before the Legislature at the present time, but let it be understood that it intended to delay the Bill only until the next session or until the end of the war.

Quebec members of the Association, said Mr. DuBose, had a year or more to convince the people of Quebec that it would be a mistake to change their present system of handling the electrical business. They had a wonderfully good tale to tell, because Quebec had a record of accomplishment in the electrical field which was second to none. According to the latest reports of the Dominion Government, Quebec's utilities had developed more electric power and paid more money in taxes than those of all the rest of Canada put together. Moreover, the average price of electricity sold within the borders of Quebec was lower than in any other province. None should be prouder of this record than the Quebec Government itself.

The Public Service Board's report covering the first quarter of this year shows that 5,125 million kWh was generated, 27.3 per cent. more than in the first quarter of 1941. Industrial sales rose by 35.6 per cent., one per cent. more than the rate of increase in the 1941 calendar year, and in the aggregate amounted to 3,047 million kWh.

Water Power Control

The Quebec Legislative Assembly recently put through a measure to extend the powers of the Quebec Streams Commission in the development of water-power resources. In regard to the development on the Ottawa River, Mr. P. E. Cote, Minister of Lands and Forests, said that the best system would involve Quebec and Ontario ceding each other certain sites, and the two provinces dividing the power at Paquette between them. This meant that Quebec, through the Carillon and allied developments in the lower river, would get some 360,000 HP, while Ontario, from its development at Des Joachim Chenaux and Cave and Fourneaux would get about 347,000 HP. Each province would have its own development close to its market. The division of the power sites would work out better than development of each site by both provinces and then dividing the electricity.

Symmetrical Components

Analysis by Vector Notation

By A. G. Powell, A.M.I.E.E.

IT is possible to define a three-phase system of currents in several ways. If the system is balanced, all that is necessary is the phase and magnitude of one of the three components. As in an unbalanced system one component is equal and opposite to the sum of the other two, such a system can be defined by the magnitude of two of the components and two phase angles.

The theory of symmetrical components is based on the fact that any three-phase unbalanced system may be resolved into three balanced systems of vectors, two of which have opposite phase sequences, the third being single-phase and representing the residual when this condition is present.

Thus, the three component systems are:—A positive phase-sequence system having the standard direction of phase sequence, *i.e.*, anti-clockwise; a negative phase-sequence system having the opposite rotation; a zero-sequence component which is single-phase.

In an unbalanced three-phase system in which the vector sum is zero, the positive and negative phase-sequence components only are present, but where this is not the case there is also a zero phase-sequence component, and the system can be regarded as effectually four-wire (perhaps due to fault conditions), in that the sum of two of the vectors is not balanced by the third. The zero-sequence component can therefore be regarded as that necessary to reduce a four-wire to a three-wire three-phase system.

The graphical method of finding the positive and negative phase sequence components is shown in fig. 1 where A, B, and C are vectors forming an unbalanced three-phase three-wire system, A_1, B_1, and C_1 and A_2, B_2, and C_2, being the positive and negative phase sequence component systems respectively. To determine the positive component, the resultant of A, B turned through 120 deg. anti-clockwise and C turned through 240 deg. anti-clockwise is found and divided by 3, this giving the component in magnitude and phase. The negative-sequence component is similarly found by taking one-third the resultant of A, B turned through 240 deg. anti-clockwise, and C turned through 120 deg. anti-clockwise.

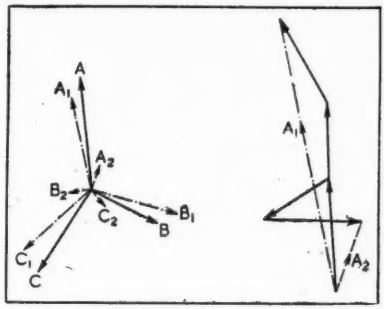


Fig. 1.—Graphical method of finding positive and negative phase sequence components

The method of analysis by vector notation makes use of the operator $(-0{\cdot}5 + j\,0{\cdot}866)$ which indicates the rotation of a vector through 120 deg. anti-clockwise, and is represented by the symbol "a". Similarly a^2 indicates the application of this turning twice, *i.e.*, through 240 deg. anti-clockwise, and is equal to $(-0{\cdot}5 - j\,0{\cdot}866)$.

Thus the three vectors of a three-phase system of positive or anti-clockwise sequence, A, B, and C, could be represented by A, a^2A, and aA, or $A(1 + 1a^2 + a)$, and, if of the opposite or negative rotation, by A, aA, and a^2A, or $A(1 + a + a^2)$.

It should also be noted that in an unbalanced system A, B and C, if A_1, B_1, and C_1 represent the positive sequence components, and A_2, B_2, and C_2 the negative, then $A = A_1 + A_2$, $B = B_1 + B_2 = a^2A_1 + aA_2$ and $C = C_1 + C_2 = aA_1 + a^2A_2$.

The graphical operations are hence represented by (1) $A_1 = \frac{A + aB + a^2C}{3}$ and (2) $A_2 = \frac{A + a^2B + aC}{3}$

Suppose the vectors of fig. 1 to be as follows:—$A = -1{\cdot}5 + j\,14{\cdot}0$, $B = 8{\cdot}0 - j\,4{\cdot}0$, $C = -6{\cdot}5 - j\,10{\cdot}0$. Then $aB = (-0{\cdot}5 + j\,0{\cdot}866)(8{\cdot}0 - j\,4{\cdot}0) = -0{\cdot}54 + j\,8{\cdot}93$, $a^2C = (-0{\cdot}5 - j\,0{\cdot}866)(-6{\cdot}5 - j\,10{\cdot}0) = -5{\cdot}41 + j\,10{\cdot}63$, and $A + aB + a^2C = -7{\cdot}45 + j\,33{\cdot}56$. Hence $A_1 = -2{\cdot}48 + j\,11{\cdot}19$; $a^2B = (-0{\cdot}5 - j\,0{\cdot}866)(8{\cdot}0 - j\,4{\cdot}0) = 7{\cdot}46 - j\,4{\cdot}93$, $aC = (-0{\cdot}5 + j\,0{\cdot}866)(-6{\cdot}5 - j\,10{\cdot}0) = 11{\cdot}91 - j\,0{\cdot}63$, and $A + a^2B + aC = 2{\cdot}95 + j\,8{\cdot}44$. Hence $A_2 = 0{\cdot}98 + j\,2{\cdot}81$.

An examination of this process (see fig. 2) will show that the turning of B through 120 deg. $= aB = a(a^2A_1 + aA_2) = a^3A_1 + a^2A_2$, and C turned through 240 deg. $= a^2C = a^2(aA_1 + a^2A_2) = a^3A_1 + a^4A_2$).

As $a^3A_1 = A_1$ and $a^4A_2 = aA_2$, the

sum of these two resultants and $A = (A_1 + A_2) + (A_1 + a^2A_2) + (A_1 + aA_3) = 3A_1 + A_2(1 + a^2 + a)$ which as $(1 + a^2 + a) = 0$, $= 3A_1$. In other words, the rotation of the

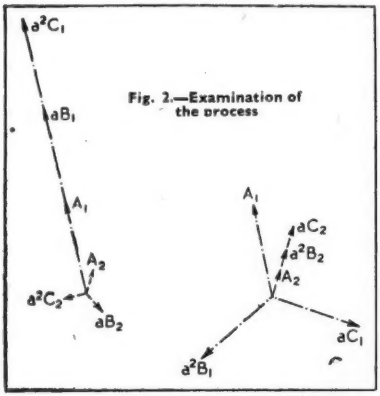


Fig. 2.—Examination of the process

vectors B and C and their addition to A has the effect of cancelling out the negative-sequence components.

Likewise in the case of the negative-sequence component, the rotation applied to the vectors B and C results in $a^2(a^2A_1 + aA_2) = a^4A_1 + a^3A_2$, and a $(aA_1 + a^2A_2) = a^2A_1 + a^3A_2$, and the sum is $(A_1 + A_2) + (aA_1 + A_2) + (a^2A_1 + A_2) = 3A_2$.

Of the many alternative methods, graphical and by calculation, of determining the components, one only will be mentioned. If the phase separation of any two of the unbalanced components is decreased by 60 deg., the resultant gives the magnitude of the positive-sequence component $\times\sqrt{3}$, and this component correct in phase and magnitude is one of the sides of an isosceles triangle formed on this resultant reversed. The negative-sequence component may be found in a similar manner by increasing the separation of any two phases by 60 deg.

Compulsory X-rays

IN future all successful candidates for posts under the Penmaenmawr Urban District Council will have to undergo an X-ray examination of the chest.

In moving, at a recent meeting, the resolution bringing this rule into effect Dr. R. Salter Ellis referred to a memorandum issued by the Welsh National Memorial Association on the prevention of tuberculosis and said that the early stages of the disease could be discovered only by X-ray examination. The ultimate ideal was for everybody to be X-rayed, and pending the attainment of that ideal it was, he considered, the duty of local authorities to enlighten public opinion.

Public Transport

"Fanciful Schemes" of Future Planning

ADDRESSING the annual meeting of the Public Service Transport Association in London last week Col. Sir Joseph Nall, M.P., chairman of the Council, spoke of what he described as the "fanciful schemes of future planning which are being so thoughtlessly bandied about." He had, he said, been surprised to read of Lord Reith's suggestion for putting all transport under a National Board. It was so easy for people not actively engaged in a particular industry to generalise on proposals for great monopolistic corporations without pursuing their ideas throughout the field of national industry.

After all, to the primary essentials of civilised life and to all other industries and social amenities transport, gas and electricity were the secondary and subsidiary servants. If the country were persuaded to adopt the principle of vast corporate bodies all and not merely a few of the necessary aids to civilisation must be affected.

He considered the public fortunate in that the passenger transport services had not so far been subjected to anything so wasteful as the national road haulage scheme, with its redundant staffs of several thousands superimposed on an industry which was admirably standing up to the strain of the war effort. The task of the Government should be to keep the ring, prescribe the field and encourage the full resumption of legitimate enterprise, while protecting the whole against undue exploitation by any single interest.

War Damage Insurance

Touching upon matters dealt with during the year, he said that jointly with the Municipal Passenger Transport Association they had proposed to the Treasury that all passenger transport undertakings should be brought within the scope of the War Damage Act, 1941, rather than that there should be special legislation for statutory undertakings. A further memorandum was being submitted in support of this point.

With regard to workmen's fares, the chairman said that they were still affected by legislation dating from the old Tramways Act of 1870. Under war conditions there had been calls for the issue of workmen's fares to shift workers going to and from work outside the normal hours. It was felt by the Council that, while there might be little prospect of getting the principle abolished during the war, the time was overdue when the industry should register its most emphatic objections to the anachronism of workers' special fares. In reply to representations the Minister of War Transport had said that he could not agree with the abolition of workmen's fares, but he accepted the proposals for issuing tickets to shift workers in such a way that abuse could be largely obviated.

Now that the building of public service vehicles was almost suspended, a unique opportunity was presented of securing realistic amendment of the regulations governing the dimensions of vehicles. This matter was now receiving active consideration and a memorandum would be submitted to the Minister.

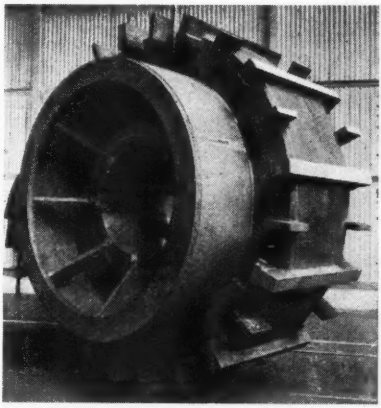
With regard to the domestic affairs of the Association, the chairman said that there had been a further steady increase in membership.

Fusion Welding—II

Diversity of Applications

A USEFUL note on which to open this second article is a summary of conclusions drawn from the first article (*Electrical Review*, July 17th) bearing on applications. There is excellent equipment available to cover a very wide field of applications—from general repair-shop work to large ship construction.

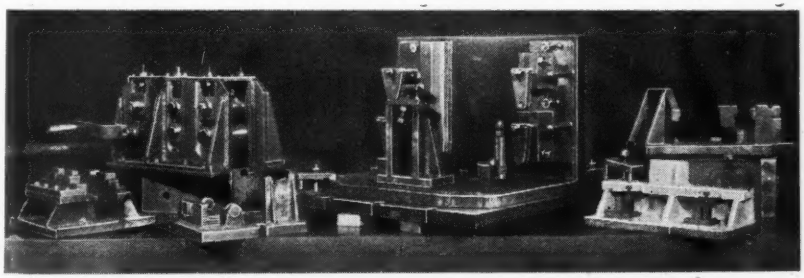
Each set necessarily has a wide range of working (current); the Cleco set, for instance, will serve from No. 18 gauge sheets up to heavy plates. The range extension for any one set, as compared with a smaller one, is almost entirely at the high-current end. Thus the Oerlikon AC equipment includes a 14/150-A set for very light work; a 14/220-A set for medium welding of thin-gauge metals; and 18/280-A, 40/380-A and 50/500-A sets for heavy welding, *e.g.*, such work as the construction of structural parts and boiler making. It is now generally conceded that AC is suitable for most work, particularly where mild-steel is the material to be welded.



Fabrication of a mill-motor armature permitted strengthening exactly where required without adding weight

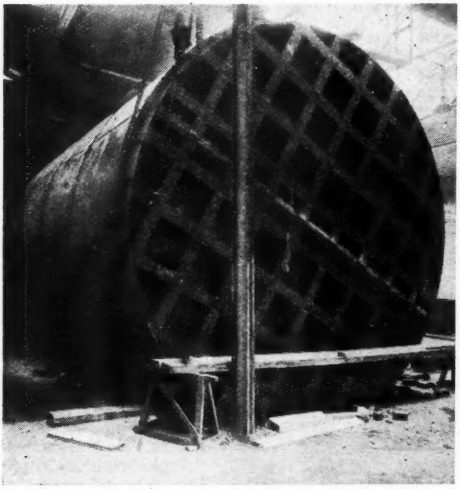
With regard to heavy-duty welding, a modern tendency is to use heavy welding currents of, say, 400/600 A for the major operation and small sets for "tacking up," and from Cooke & Ferguson, Ltd., we learn also of an important allied development in the replacement of cast-iron by mild-steel for the manufacture of small jigs, milling machines and lathe beds by fabrication. Photographs from the English Electric Co., Ltd., depict some particularly interesting examples of heavy fabricated electrical equipment. One is of a mill-motor armature in which both static and dynamic stresses are set up; the fabricated construction enables the necessary strengthening to be made in the exact positions required without adding unnecessary weight to the structure. The rotor of a 16,666-kVA vertical-shaft waterwheel alternator was fabricated in two halves and then bolted together. A typical example of the equipment suitable for such heavy-duty fabrication work is the 425-A single-operator drooping characteristic set by A. Reyrolle & Co., Ltd. An outstanding example of complicated fabrication is a foreign gun-carriage which consists of eight major and 29 other weldings in which there are 511 separate pieces.

One of the heaviest-duty welding jobs of which we have heard relates to the construction of an ingot bogie which is used for the regular transportation of huge steel ingots of up to 300 tons in a steelworks. With overall dimensions of 57 ft. 6 in. long, 8 ft. 6 in. wide and 6 ft. 6 in. high, it is an all-



An important development is the replacement of cast-iron by mild-steel for the manufacture of jigs

welded structure comprising a main underframe which rests upon two intermediate frames. These intermediate frames are, in turn, mounted upon four six-wheel bogies.



Single-run welding with ¼-in. electrodes and currents up to 700-A was employed on this large vacuum oven

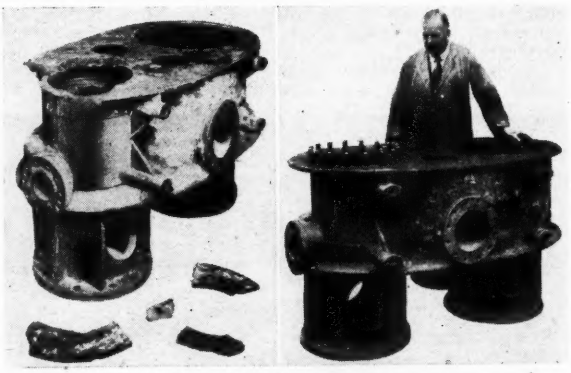
About 11,000 ft. of heavy welding was required in the construction of a very large vacuum oven designed to withstand a vacuum of 27 in. at 180 deg. F. The shell consists of eight semi-circular section ⅝-in. rolled-steel plates. By using currents up to 700 A (AC) single-run welding was effected with ⅜-in. electrodes from English Electric plant. One-piece shell cylinder construction appears to lend itself particularly well to automatic welding, but satisfactory results demand a properly designed fixture and welding head. The "Plastic Arc" fully automatic head for welding with flux-coated electrodes consists of a differential gear unit driven by two motors so connected in the control system that they maintain complete automatic arc regulation. With a suitable clamping and rotating fixture, coupled with a self-propelling travelling carriage for the automatic head, the cylinder remains stationary and the head traverses the seam for longitudinal welding, while for the circumferential welding process the head remains stationary and it is the cylinder which is rotated.

Reconditioning Work

We attach the utmost importance to the use of welding for repair work, having seen so many valuable contributions to the war effort in this way, including repairs hitherto regarded as impracticable. Cast frames of motors and generators can be fully restored in strength after a smash, and fractured engine-cylinders and heads can be readily made whole again. But perhaps the most convincing of such repair work is the re-uniting of broken crankshafts, usually through a web. Mr. C. W. Brett, of Barimar, Ltd., assures us that complications of this kind do not prevent a repair to within ±0.001 in. Often the heavy nature of the work, transport difficulties and urgency demand repairs on site, and for such work emergency squads with portable self-contained plant are held in readiness for immediate despatch to site.

An outstanding repair job relates to the cast-steel hydraulic cylinder of a 2,000-ton cable-sheathing press which had cracked longitudinally from end to end. The repair was carried out by International Combustion, Ltd., and over 3,000 electrodes were used, representing the deposition of over 5 cwt. of metal. The actual welding operation covered a whole week-day and night.

The great success of electric welding for repair work has a very definite bearing on the



Engine cylinders and heads can readily be made whole again to ± 0.001 inch; compound steam engine cylinders before and after repairs

ability nowadays to unite metals differing widely in character. Steel to aluminium welding is a notable example, considering their different expansion coefficients. Copper welding presented much difficulty at first, but is now a satisfactory process, while even metals having a large magnesium content and which are highly inflammable in the form of swarf or filings can now be welded efficiently and without danger. Such "unorthodox" welding often has a deciding influence on the choice between AC and DC, but because of the very great divergence of opinion on this point and of the ever-increasing pace of development we consider that it would be most unwise to attempt to assign any particular duties to any one form of supply.

No doubt the very big reductions in the costs of high-grade electrodes has had much to do with the rapid advance in arc welding, for a, say, 50 per cent. reduction in deposition material costs can easily bring a works welding process into the economical field. Again, the wider range of electrodes to meet the requirements of different applications is a big influence. For instance, the various Lincoln mild-steel electrodes are classified by the method of use with regard to the working position, *i.e.*, flat, vertical, overhead, and horizontal; by the type of joint, such as fillet and deep groove; by the physical characteristics of the deposit, such as tensile strength and ductility; and by the shape of head, such as flat, convex or concave.

New electrodes have also been developed to give greater welding speeds, while, incidentally, such high-speed electrodes have made greater and more precise demands on the major welding equipment. With modern high-speed, heavily-coated, extruded electrodes the machine must deliver 40 V at the arc, while the larger electrodes now in use ($\frac{1}{4}$, $\frac{5}{16}$ and $\frac{3}{8}$ in.) require currents up to

Care must be taken to employ suitable pliers for the heavier electrodes

Over 5 cwt. of metal was deposited in the repairs to a 2,000-ton cable-press cylinder; partially completed weld

400 A and more for heavier work. It has been found that with such large electrodes and suitable current selections multiple runs can be dispensed with. Care must be taken to employ suitable pliers for these heavier electrodes, for an electrode holder designed for 200 A service will prove totally inadequate for $\frac{5}{16}$ in. and $\frac{3}{8}$-in. electrodes.

Carbon arc welding, which was the original form of fusion welding and is essentially DC, is still used for certain kinds of work, especially for sheet-metal constructions of mild and stainless steel. The method is one of puddle welding rather than deposition, the carbon being employed merely to draw the arc; but where additional metal is required a filler strip is first laid along the seam. The carbon burns very slowly and high welding speeds are obtainable because carbon electrodes will carry a higher current than metallic ones. The carbon electrodes are available with filler rods, of course, but in such cases the operation is either deposition welding or a combination of this and puddling. The carbon arc seems to lend itself very well to automatic welding, whereby as the

carbon moves along the seam the plate edges fuse and cool simultaneously.

For precision work a notable development is atomic hydrogen welding in which the weld is protected during the process by a gaseous field which protects the molten metal from atmospheric contact and thus prevents the formation of minute blemishes and a reduction in the quality of the weld metal which may be caused by the presence of oxygen. An arc is drawn between tungsten electrodes and the molecules of hydrogen fed into the arc are split into atoms and on combining again they give off heat with the result that the work piece is melted in the hydrogen atmosphere. This method is often employed for reconditioning when worn parts are built up by filler deposition and then ground to a precision finish.

We learn from the A.C. Welding Co., Ltd., of a high-frequency pilot arc attachment which is recommended for use in welding thin-gauge material down to 20 or 22 SWG. This device superimposes upon the welding circuit a high-frequency current which not only ensures easy and reliable starting of the arc, but produces a highly stabilised arc for meticulous work. Another development, so far exclusively American we believe, relates to the preheating of the work for normalising purposes. Such preheating is produced by hysteresis effect consequent on the passage of heavy AC in several turns of conductor wrapped round the job on each side of the weld. This heating process can be continued during and after welding and controlled to maintain a set temperature.

We believe that the skill of the operative stands out above all other factors in successful welding in the cases of special material and meticulous work, and that this point needs great emphasis because a good deal of misunderstanding exists with regard to the training of operatives. Many schemes exist for the training of men and women in six weeks or so, and while we agree that operatives so trained are competent in a very large section of the fusion-welding field, there is not the slightest doubt that for specialised welding very much greater skill is required than can be obtained from such short-period training. Indeed, for such work it is often very desirable to first select the right type of operative for training.

Limitation of Supplies

Arrangements for New Period

THE Limitation of Supplies (Miscellaneous) (Nos. 13, 14 and 15) Orders (S.R. & O. 1941 No.1813, 1942 Nos. 187 and 1028) which at present control the supply of various classes of goods, expire on July 31st, 1942. The Board of Trade announced on July 3rd the arrangements made to control the manufacture and supply of certain goods on and after August 1st and those classes of goods which will still be subject to a Limitation of Supplies Order after August 1st.

The Board has now announced that the standard period on which quotas under the new Limitation of Supplies (Miscellaneous) Order will be assessed will be the twelve months ended May 31st, 1940. The restriction period will be the six months beginning August 1st.

Lighting Fittings

The permitted rate of supply of lighting fittings (Class 9b) during the restriction period will be 10 per cent. Manufacturers may provide 5 per cent. of the amount supplied by them in the standard period. Within this quota, only goods of which the manufacture will still be permitted after August 1st may be supplied. The supplies in the standard period will be the amount supplied of all goods controlled in the class, or part of the class, including supplies of those goods which will not be permitted manufacture after August 1st. For wholesalers the quota will be 5 per cent. Within this quota, permitted goods and stocks of goods of which the manufacture will be prohibited after August 1st, 1942, may be supplied. It should be noted that, notwithstanding these quota arrangements, the supply, by manufacturers, of certain items within these classes will be prohibited after certain dates subsequent to August 1st. Details of the classes of fittings covered by this paragraph were given in the *Electrical Review* of July 10th (p. 46).

In the new Limitation of Supplies (Miscellaneous) Order, there will be no Third Schedule for special consumers. During the restriction period, quota-free supplies of various classes of goods to various special consumers will be allowed by general licences but supplies to such consumers during the standard period will be included in the standard period figures. The Home Trade Register will be revised to meet the altered arrangements.

Space-heating Equipment

The present Limitation of Supplies (Heating Apparatus and Polishes) Order (S.R. & O. 1942, No. 1052, Price 2d.) gives the quotas for June and July only. The next restriction period will be the four months beginning August 1st and the standard period will be, as before, the six months ended November 30th, 1939. The rate of supply will continue to be 25 per cent. for heating apparatus. Thus registered manufacturers and other registered traders will be permitted to supply electric and gas heating apparatus during the four months' restriction period to the value of 16⅔ per cent. of their supplies during the six months standard period.

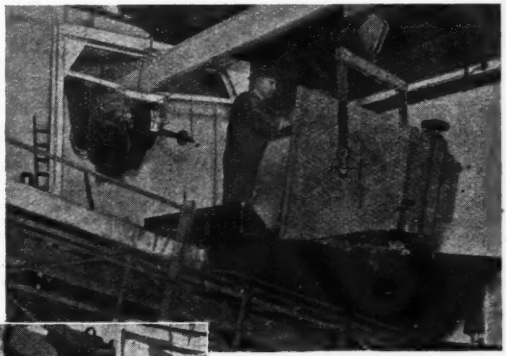
A General Licence has now been issued (S.R. & O. 1942, No. 1285, Price 1d.) permitting indirect supplies outside quota to persons specified in the Third Schedule, by registered persons on receipt of a declaration, in a form specified in the licence.

Large Pig-Food Plant

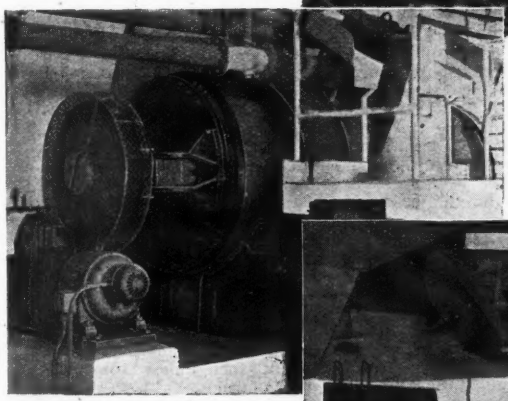
Electricity's Part in Westminster Enterprise

SINCE it is designed to handle the waste food not only in its own area, but also in six neighbouring boroughs, the Westminster City Council's new pig-food plant, or to give it its official title, the Westminster kitchen waste and concentrator plant, includes a considerable amount of electrical equipment to assist in producing an average output of 120 tons a week.

On arrival at the "receiving area," which is outside the building, the crude waste is tipped into 10-cwt. containers which are elevated by means of an electrically-driven travelling hoist (made by the A.C.E. Machinery Co. and incorporating a 7-HP motor) to the sorting department on the first floor. Here the containers are discharged into a large hopper feeding a travelling and traversing picking conveyor, which provides the means for removing any matter not required and also for delivering the food on to the floor adjacent to the hoppers serving two concentrators beneath (Industrial Waste Eliminators, Ltd.). The motor employed on this conveyor is a 3-HP Brook



Food container, suspended from hoist, being tipped into the receiving hopper of the picking conveyor



A 15-HP motor driving the agitator of one of the concentrator plants and (right) the delivery end of the picking conveyor

synchronous unit running at 1,500 RPM. In the concentrators the food is sterilised, at a temperature of about 260 deg. F. under a pressure of 30–40 lb. per sq. in., in steam-jacketed cylindrical containers for a period of two hours, during which rotary agitators keep the mass in continual motion. The agitators are operated through "Radicon" 1,450/74-RPM reduction gears by 15-HP Brook motors equipped with Airedale Electrical Manufacturing Co. starters.

Fuel and Power

Major Lloyd George on Co-ordination

LORD McGOWAN presided at a luncheon to Major G. Lloyd George, the Minister of Fuel and Power, organised by the Institute of Fuel and held at the Connaught Rooms, London, on Friday last week. Introducing the guest, Lord McGowan said that he was sure that the mantle of his famous father would fall on able shoulders. For many years fuel matters had been in the position of Cinderella ; now with the establishment of the Ministry they would receive the attention to which their importance entitled them.

Fuel economy meant proper utilisation and every attention should be paid to the cleaning, grading and allocation of coal. If the matter were scientifically handled many millions of tons could be saved. Co-operation between producers and users of coal and its derivatives was essential. Research was of paramount importance and even in wartime we could not afford to drop long-range investigations if we were to keep abreast of other countries. The scientists and industrialists present were all anxious to assist the Ministry not only as a means of winning the war but with a view to reconstruction afterwards.

At present we were fighting with our backs to the wall but there was no weakening in our people's determination to wipe out the spirit of aggression.

The Country's Life

Major Lloyd George, in the course of his response, said that while he was in the job he had just left he was half-starved by his friends in their anxiety to show him how economical they were with food. Now, he supposed, he would get dirtier and colder as they demonstrated their keenness for fuel saving. He went on to say that coal had been described as the life blood of this country; it was more than that, it was the country's life. Coal was an asset which had enabled us to gain the position which we had held for so many years. But it was a wasting asset and we had to make the best of it not only during the war but in peacetime too.

It was strange that it had been left until now to form a Ministry to deal with it. Speeches of past-presidents of the Institute had maintained that it was vital that the coal industry and those associated with it should be co-ordinated. They had said that gas and electricity should not be rivals; there should be proper liaison to avoid duplication and waste. These speeches pointed the way to a Ministry of Fuel in charge of a competent person. He hoped that the latter condition had been fulfilled; at all events he fully appreciated the need for proper co-ordination. The report of the 1935 Coal Commission had laid it down that the first aim should be the proper use of coal in the production of gas, electricity, etc. That was his policy.

The co-ordination of the great resources of the country for winning the war was now the first consideration. The serious gap between production and consumption had to be closed. Economies must and could be made, both domestic and industrial, without serious inconvenience or reduction of efficiency. It was the Ministry's task to show how it could be done and he was going to see that the public received this guidance. Production was not satisfactory at the moment but he hoped to improve matters. Only by pulling together could we solve the problem. Actually the increased consumption was a good sign of our growing production.

Differentiation Impracticable

He agreed that the proper cleaning, grading and allocation of different kinds of coal to different classes of consumer was most desirable but, he had to be frank, in the present circumstances it was impracticable. They would make every effort to this end but there were too many appliances with "selective appetites." This made the securing of efficiency much more difficult but the maximum economy had to be obtained with existing supplies. The knowledge and experience of all in the industry was needed to help in solving this great problem.

A committee was sitting to study the subject of fuel economy. It had found that much could be done to improve efficiency of use; a great deal had already been accomplished by voluntary effort. During the next three months the utmost must be done to secure the necessary saving. The position was now much the same as when the Fuel Research Committee in its 1918-19 report said that even in well-managed works there was waste of fuel unless someone was appointed to control it.

He welcomed the offer which had been made by Lord McGowan of the services of the Institute's members. The Ministry wanted the fuel industries to be complementary not competitive. There were great difficulties confronting us but there were also great opportunities. Coal and skill were our two priceless assets; if they were fully employed the opportunities would far outnumber the difficulties.

The proceedings concluded with a vote of thanks to Major Lloyd George and Lord McGowan proposed by Lord Dudley Gordon.

CORRESPONDENCE

Letters should bear the writer's names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions.

Short-Circuit Thermal Effects

YOUR recent articles dealing with the thermal effects of short-circuit current on cables and switchgear have prompted me to refer you to my inaugural address as chairman of the Tees-side Sub-centre of the Institution of Electrical Engineers (*I.E.E. Journal*, 1938, p. 81) in which I included a set of curves graphically relating short-circuit current to current density and final temperatures of copper conductors.

I note that your contributors are not generally in disagreement with the conclusions stated therein.

Billingham, Co. Durham. J. H. HAWS, *Gas and Power Works*, I.C.I. (Fertilizer and Synthetic Products), Ltd.

[The curves referred to, which were calculated, not based on observed values, indicated that a maximum permissible temperature rise of 100 deg. C., which Mr. Haws suggested was not conservative, would be attained in 0.5 sec. with a current density of 120,000 A per sq. in., the initial temperature of 20 deg. C. finally reaching 120 deg. C., which would be excessive for paper and rubber insulation. That density, the maximum permissible, when multiplied by the section of the cable in sq. in., would determine the maximum short-circuit current that might be carried by that particular cable.

Reference to kVA scales relative to current and voltage showed that the minimum size of cable permissible was considerably greater than that in common use, and that small cables in situations subject to heavy short circuits might well lead to absurdly great temperature rise. Mr. Haws advocated comparison of observed and calculated values, jointly by the Cable Research Committee and one of the short-circuit testing stations, which alone could provide the large current necessary for the purpose.—Editors, *Electrical Review*.]

Preventing Waste

IN April last I contributed a letter to your correspondence section dealing with fuel rationing. I enclose herewith a report I have submitted to my Electricity Committee dealing with the history of this matter. To bring this report up to date, I must inform you that I wrote to the Commissioners concerning their letter o July 4th, pointing out that the Waste of Fuel Order could not be enforced by reporting waste to the Commissioners. The Commissioners, in their reply, stated that where an engineer observes wasteful use he can by discreet and tactful comment draw attention to the waste, and added that the question of issuing a further Order laying down a standard of interior lighting was under consideration, and that the possibility of utilising the services of officers of electricity undertakings in connection with the operation of any such Order was being borne in mind.

I am bringing this matter to your notice because I think that it should be widely known, and that the industry should understand, how difficult it is for the individual to do anything because of the insuperable obstacles raised by those in authority. I made this suggestion in January, and it is now brought into being and no acknowledgment has been made, and even now there seems to be no attempt on anybody's part to make it really workable.

Barking. A. B. CATLING, *Borough Electrical Engineer.*

[The report to which Mr. Catling refers sets out the efforts which he has been making since last January to persuade the authorities to take definite steps to define and prohibit the wasting of fuel and make satisfactory arrangements to enforce any measures which might be introduced. He refers to the subsequent Orders designed to eliminate waste, and ends with a reference to the Commissioners' request to electricity supply undertakings to report any cases of "flagrantly extravagant use of electricity."—Editors, *Electrical Review*.]

Institution Membership

IT seems to me that the Institution of Electrical Engineers has much to gain and nothing to lose by admitting to corporate membership such people as your correspondent "Midlands." After all, would he be where he is if he were not a capable engineer?

The academic man is not necessarily the best in any branch of applied science, as is generally agreed. I understand it is the industry that the Institution is primarily concerned with and the sentiments expressed by "Examination" make me think he would do well to associate himself more with the practical side than to remain in the rarefied atmosphere of the examination room.

OVER FORTY.

SURELY it was not intended by the founders that the I.E.E. should be a watertight association of the "academic brains" of the industry. The intention was that it should consist of engineers of all branches, each proficient in his own special section, and each subscribing his quota of knowledge.

"Midlands" with his forty years' experience has more to give to the I.E.E. than the Institution has to offer him. "Examination" obviously lacks vision and broadness of outlook. I choose my staff by their ability to

do the work, not by their academical qualifications. His are not constructive remarks.

I am associated with one of the oldest electrical manufacturing firms in this country which has an international reputation second to none—it also has, among its entire staff of 1,800, one member only (of associate member grade) in the I.E.E. This is further proof that the Institution is not representative of the best of electrical industry.

Membership should be based on individual " record of achievement " and not on purely theoretical proficiency. If only one enlightened Council member will raise the matter, his name will go down to posterity as a benefactor of the electrical industry—and the I.E.E.

PROGRESS,
A.M.I.Mech.E., M.Amer.I.E.E.

THE letter from " Examination " in your issue of July 10th really raises the point as to what is an indication to the public or a prospective employer of a candidate's right to lay claim to the title of electrical engineer. An engineer's equipment is composed of two parts, theory, and practical skill; some lean towards one and some towards the other. There is ample room for both if this natural trend is not interfered with, but the really capable solid practical engineer of long experience, who is as important as any other class, does not appear to be receiving the same recognition.

If the theoretical standard is put too high the learning takes so long that the youth is a grown man before he starts getting practical experience. This is serious because once he is turned, say, twenty-one he has lost for ever the invaluable practical knowledge accruing from close contact with men, shops and machinery before that age.

Theoretical people are prone to look down on the practical type because of the latter's inability to attain a high standard of mathematical dexterity, appearing to think that this means a man has dodged something in life or failed to face up to it because of some natural inferiority or lack of application. but they forget that they are just in the same position when it comes to the practical side and are just as unable to solve a series of shop conundrums. This brings us to the point as to whether the people who have extensive theoretical knowledge but little practical ability have any more right to a designation denoting a qualification than the practical man who knows little theory. The remedy is not for the Institutions to take in anybody, but to balance better theoretical knowledge and long practical experience and practical ability.

The trouble with the professional examination is that if not most carefully contrived and balanced it forces people to spend valuable time learning things they never require later, to the detriment of their practical training. Incidently, it is not much use comparing engineers with, say, lawyers except that one may know the law well enough, but put up quite a poor show in court when practically applying it.

I could never see the use of trying to divert so much sound material into one channel, which is what present-day trends amount to. Forty years' experience has shown me that the real backbone of industry is represented by the draughtsman-designer, shop manager and practical specialist class who have the necessary balance between theoretical knowledge and practical experience.

CHARLES BAXTER,
Preston. M.I.Mech.E., etc.

Prefabricated Buildings

FURTHER to your notice concerning our work in your issue of June 26th, I wonder if you would be good enough to give us space to emphasise the extreme importance of our proposals to the electrical industry as a whole.

From the very considerable amount of data already in our possession it seems clear that the new materials and methods of construction now being developed would raise many questions regarding not merely the actual installation of electrical equipment but its type and design. For example, the internal lining of houses with prefabricated panels suggests that provision must be made during manufacture, not only for wiring, but for the installation and, perhaps, incorporation of lighting fittings. The same remarks apply, of course, to electrical heating appliances, and it seems probable that kitchens and other domestic offices will be planned as complete units. This would seem to involve agreed standards of size and design of such items as washing machines, refrigerators and so on.

Clearly such mass production can only become practical if on a very large scale, and experience in other countries shows that economies are thus produced which open up a large market amongst the lower-income grades for items of domestic equipment now looked upon as luxuries only applicable to the middle and higher grades.

R. PERRY,
*London, W.*1. *Executive Officer.*
Committee for the Industrial and Scientific Provision of Housing.

Installation Points

IN your issue of July 3rd, under the heading of " Installation Maintenance," it is reported that Mr. S. W. Field condemns semi-recessed ceiling roses as being thoroughly bad. While I agree with him that the hard, or permanent, wires in the boxes have to be disturbed for alterations to, or renewals of, flexibles I have not found any difficulties

arising from this in actual practice. Before any harm could actually be done to these wires it would be necessary for the insulation to be very hard, dry and brittle and in normal circumstances it would be some years after installation before they would be badly affected.

If Mr. Field or anyone else thinks the semi-recessed ceiling rose is so thoroughly bad the remedy is quite simple. There are plenty of surface ceiling roses with 2-in. fixing centres that can be mounted on the conduit ceiling rose boxes which would allow the hard or permanent wires to remain undisturbed when flexible cord renewals or alterations were necessary. As a matter of fact these surface ceiling roses are better to use on conduit boxes if frequent renewals or alterations to flexible cords are likely, as it is undoubtedly a much simpler job to fix a flex to them.

Mr. Field also refers to the desirability of extended use of small circuit-breakers. My experience is that these are not standing up to their work as one would wish, otherwise there would not be so many renewals required. There appears to be room for considerable improvement in the contacts and I wonder if the type of contact used in good class tumbler switches would not be more reliable. For small circuit-breakers in constant use it might be possible to adopt, with advantage, small mercury switches.

Bradford. HARRY MOSS.

PERSONAL and SOCIAL

News of Men and Women of the Industry

THE Council of the Electrical Wholesalers' Federation has re-elected **Mr. A. G. Beaver** (Sun Electrical Co., Ltd.) as president and **Mr. A. Glenister** (Holland House Electrical Co., Ltd.), as vice-president of the Federation. Normally, Mr. Glenister would have succeeded to the office of president, but the prevailing conditions raise difficulties, and it is felt the continuance of office will tend to ease the situation. This is the third time that Mr. Beaver has filled the office of president.

Mr. A. G. Beaver

The names of the Regional Controllers under the Ministry of Fuel and Power for the non-coal-producing areas have been announced. In effect they are re-appointed for they were already acting, without remuneration, as Controllers of Fuel and Power under the Board of Trade. They are **Sir John Dalton** (London and South Eastern), **Col. H. W. Woodall** (Southern), **Major E. Cadbury** (South Western) and **Mr. H. H. Holmes** (Eastern). These gentlemen have consented to continue to serve without remuneration.

Mr. A. C. Baker, general manager of the Birmingham Corporation Transport Department, was elected president of the Municipal Passenger Transport Association at its annual meeting held recently in London. Thirty-eight years ago Mr. Baker's father was president. The new vice-president is **Alderman W. Bradley,** of Bolton.

At a meeting of the Royal Society on July 16th, a gold snuff-box, once the property of Charles Blacker Vignoles, F.R.S. (1793-1875), was presented to the society by his grandsons, **Mr. E. B Vignoles** and **Lt.-Col. W. A. Vignoles.**

In making the presentation, Mr. E. B. Vignoles said that the snuff-box was given to his grandfather in 1844 by the King of Württemberg, as a mark of his esteem, after Mr. C. B. Vignoles had advised him on the plans prepared by the King's Ministers and engineers for the railways of the State. The snuff-box is of solid gold with a portrait of the King set in diamonds on the lid. Mr. C. B. Vignoles was elected a member of the Royal Society in 1855, and was President of the Institution of Civil Engineers in 1870-71.

The President, Sir Henry Dale, accepting the gift, said it would be treasured by the Society not only for its intrinsic value, but as a reminder of a distinguished past member.

Mr. W. R. Elliott, engineer and manager of the East Ham Corporation electricity undertaking, **Mr. A. C. Harvey,** deputy engineer, and **Mr. H. M. Patten,** assistant engineer, are due to retire on superannuation this year, each having served the Corporation for over 40 years. Mr. Elliott is to continue for a period not exceeding one year at his present salary, less the net amount of superannuation allowance. The Corporation has appointed **Mr. G. W. Ablitt,** assistant engineer in the Electricity Department, as deputy engineer and manager, at a commencing salary of £638 per annum.

Dr. R. Russell, B.Sc., Ph.D., has been appointed principal of the Technical College, Coatbridge, Lanarkshire. He was senior lecturer in the Department of Civil and Mechanical Engineering and Applied Mechanics at the Royal Technical College, Glasgow, and was workshop manager of the College trainees' scheme.

On July 15th the head office staff of W. T. Henley's Telegraph Works Co., Ltd., staged in the grounds of Milton Court displays by the various organisations affiliated to the Dorking Youth Committee. They included the Air Training Corps, the Women's Junior Air Corps, St. John Ambulance Brigade Corps, Boy Scouts, Girl Guides, Dorking Athletic Clubs, and Henley's "Keep Fit" Girls and Country Dance team. Vocal, ballet and character dances were contributed by a troupe of Russian artistes consisting of Madame Alexis Alhazova, Arsene Kirilloff, Cleo Nordi and Anita Douglas, and another feature was the auctioning of auto-

graphed messages of good wishes from celebrities. Sideshows were manned by members of head office staff, and although the evening's activities did not commence until after office hours, the welfare and social funds of the Dorking Youth Committee will benefit to the extent of something in the neighbourhood of £100.

The *Financial News* states that **Mr. S. S. Hammersley,** M.P., a director of a number of cotton milling companies, has been appointed chairman, without remuneration, of David Brown & Sons (Huddersfield), Ltd., and David Brown (Tractors), Ltd., as a result of negotiations between **Mr. David Brown** and the Ministry of Supply to strengthen the boards. **Messrs. T. C. Guthrie** and **R. Officer** have become directors of David Brown & Sons.

The scholarship offered annually by Lloyd's Register of Shipping on the results of a competitive examination held by the Institute of Marine Engineers has been awarded to **Mr. H. Kay,** a student at Sunderland Technical College, who is an apprentice of the North Eastern Marine Engineering Co., Ltd. The scholarship provides for a three-year full-time course in marine engineering at a British University, leading to a B.Sc. degree.

The new post of Senior Supply Officer in the Executive of the Ministry of Supply has been filled by **Engineer Vice-Admiral Sir Harold Brown,** who has been first Director-General, then Controller-General of Munitions Production since the inception of the Ministry in 1939. **Mr. Graham Cunningham,** who has been Director-General of Production Services in the Ministry since he left the War Damage Commission in August, 1941, has now become Controller-General of Munitions Production.

Obituary

Mr. F. C. Jennings.—We regret to announce the sudden death on July 9th at the age of fifty-eight of Mr. F. C. Jennings, who had been works engineer with W. T. Henley's Telegraph Works Co., Ltd., since April, 1919. Mr. Jennings served his apprenticeship at Ind Coope's Brewery at Romford, at the conclusion of which, in June, 1903, he entered Henley's service, thus having completed thirty-nine years with the company.

Mr. E. Gledhill.—We regret to record the death of Mr. Eric Gledhill, which occurred on July 15th, in a Wolverhampton nursing home. Mr. Gledhill, who was forty-one, joined the Electric Construction Co., Ltd., at the end of 1931 as manager of the transformer department. The manufacture of power transformers by the E.C.C., although one of its very early activities, had been suspended for many years, and to all intents and purposes transformer building was a new departure at the time of his joining the company. Under his guidance it soon became an important and flourishing section of the works. In 1935 he also took over the mercury-arc and metal rectifier department.

Mr. Gledhill entered Faraday House with a scholarship in 1917, passed all examinations with honours, won the silver medal during his first year for the highest aggregate of marks, and took the B.Sc. (Engineering) degree of the London University as an external student. He was in the design department of the British Electric Transformer Co., Ltd., from 1921 to 1924 ; in the latter year he joined the Hackbridge Electric Construction Co., Ltd., as assistant chief designer. He became chief designer in 1927 and in 1930-31 spent a year in Canada for the company, the first six months in supervising the installation of transformers and the remainder of the time in charge of the Montreal office.

Dr. R. E. Hellmund, chief engineer of the Westinghouse Electric & Manufacturing Co., died recently at the age of sixty-three.

Will.—Mr. G. J. Scott, chairman of Laurence, Scott & Electromotors, Ltd., left £47,609, with net personalty £21,952.

Parliamentary News

Fuel Economy

IN the House of Commons on July 14th Captain Gammans asked the Minister of Fuel and Power if he was aware of the waste of power due to the unnecessary use of lifts in public buildings and blocks of flats; if he was prepared to issue an order forbidding the use of lifts upwards between single floors and the use of lifts downwards except in high buildings, and in case of age or physical infirmity.

Major Lloyd George said that the suggestion was under consideration.

Mr. Douglas asked what steps had been taken to prevent waste of electricity by the use of electric lights in trains during broad daylight.

Major Lloyd George said the provisions of the Waste of Fuel Order issued on June 26th would apply to waste of light in trains.

Mr. Higgs asked the Minister of Fuel and Power if he would discontinue forthwith the principle of charging for electricity used for domestic purposes on a fixed rate plus a small charge per unit, because it encouraged people to increase consumption and penalised those who were economical.

Major Lloyd George said he did not agree that the system had the general effect suggested, since the more one consumed the more one paid.

On July 15th Captain Gammans asked the Parliamentary Secretary to the Ministry of War Transport if, in view of the reduction in road traffic, he was prepared to cut down the number of traffic lights at less important crossings, in order to save electric power.

Sir A. Salter said that arrangements had already been made for a review of all road traffic light signal installations to determine what reductions could be made.

Chilean Copper Production

ACCORDING to the Bank of London and South America the production of copper bars in Chile during 1941 is provisionally estimated at 453,527 metric tons, a substantial increase upon the 1940 production—337,700 tons. Production has nearly trebled since 1933. Exports of copper represented 60 per cent. of Chile's exports during 1941. By far the greatest proportion went to the United States (405,180 tons). Other leading customers were Japan (16,175 tons), Argentina (10,250 tons) and Brazil (8,018 tons).

COMMERCE and INDUSTRY

Post-war Installations. Fuel Economy Measures.

Electrical Planning Committee

THE Electrical Installations Committee convened by the Institution of Electrical Engineers under the auspices of the Directorate of Post-War Building consists of the following members:—Mr. J. R. Beard, Past-president I.E.E. (chairman), Mr. J. I. Bernard (E.D.A.), Miss C. Haslett (E.A.W.), Mr. P. V. Hunter (C.M.A.), Mr. Forbes Jackson (L.C.C.), Mr. J. H. Markham, F.R.I.B.A., Messrs. H. Marryat, E. A. Reynolds and W. H. Walton (E.C.A. Allied Associations), Mr. R. A. Ure (E.C.A. of Scotland), Lt.-Col. S. E. Monkhouse (Inc. Assoc. of Electric Power Companies), Mr. H. G. S. Peck (P.O. Engineering Dept.), Mr. A. G. Ramsey (Ministry of Works and Planning), Mr. H. Robinson, F.R.I.B.A., Mr. J. W. J. Townley (I.M.E.A.), Mr. V. Watlington (B.E.A.M.A.), Mr. E. B. Wedmore (E.R.A.), and Mr. H. T. Young, Past-president I.E.E. The secretary is Mr. W. K. Brasher, secretary, I.E.E.

The Committee's terms of reference are (1) To review existing information and practice concerning installations in buildings for: (*a*) the supply of electricity for all purposes from the point of entry of the current at the property boundary to the point of its delivery to an appliance; and (*b*) all forms of electrically operated tele-communications. (2) To make recommendations for practice in post-war building.

Stockton-on-Tees Salaries

At the request of the Electrical Power Engineers' Association the Stockton-on-Tees Corporation electricity undertaking has been raised from Class "E" to Class "F" in the N.J.B. schedule and the salaries of the mains' superintendent and assistant are to be adjusted accordingly.

Industrial Clothing Coupons

In the House of Commons recently Mr. Summers asked the President of the Board of Trade whether he would revise the system for the issue of supplementary coupons to those engaged in industry whose work was considered such as to warrant them in such a way as would allow managerial staff to have them in appropriate cases; what was the justification for more supplementary coupons being issued to maintenance fitters than to electricians; and whether he would expedite the introduction of a new procedure so as to eliminate the present anomalies and do away with the growing discontent and hardship under the present arrangements.

Mr. Dalton said that during the past rationing period the distribution of supplementary clothing coupons to industrial workers, in spite of many difficulties, worked well. On the evidence submitted to him, it was not established that the needs of electricians were the same as those of maintenance fitters. He hoped that in the present rationing period the arrangements, with certain changes he had in mind, would work even more smoothly than before, but it would be appreciated that, in view of the supply position, special care must be exercised in the granting of supplementary coupons.

Fuel Control Order

Under the Control of Fuel Order, 1942, which came into force on Monday last, the Minister of Fuel and Power is to issue specific directions regarding the supply and consumption of coal, coke, paraffin and other liquid fuels which can apply to any particular class of persons or premises. Among other things, such directions can specify the purposes for which, or the circumstances in which fuel is to be supplied and used and prescribe periods during which it may not be supplied and consumed. Any existing statutory or other obligation upon a public utility undertaking may be relaxed to enable the undertaking to comply with a direction.

The Order also gives authority to police constables or other authorised persons to enter and inspect premises and inspect and test fuel fittings and appliances.

Fuel Assessment Forms

Householders all over the country are now receiving fuel assessment forms in which they are required to give particulars of their houses, and use of coal, gas, electricity and paraffin. The Ministry of Fuel and Power states that these are specifically for premises wholly or mainly occupied as private dwellings. A different type of form is to be distributed later to establishments such as hotels, shops, offices, schools and restaurants.

Brewers' Economy Campaign

Many means of impressing upon their employees the urgent need of economising in fuel are being employed by Usher's Wiltshire Brewery, Ltd. Slogans such as "Munitions of War—Gas and Electricity" have been inserted in pay envelopes and used on posters, and prizes are being given for the best slogans devised by employees. A letter has been sent to all heads of departments asking them to support the campaign and do their utmost to secure effective results.

The directors have also decided that the present system of putting up the black-out arrangements shall be discontinued and the screening done after the cleaners have left the building.

Separation of Salvage

Reports reaching the Waste Paper Recovery Association show that many offices and factories throughout the country are not bothering to keep their waste paper separate from other salvage. In areas where sacks are provided for the collection of office and factory waste, it is evident that sacks provided for waste paper only are being used as general dustbins. The result is that sacks supposed to be full of waste paper are arriving at the paper mills containing every possible type of salvage—rags, string, rubber, bottles, tins and even old boots and odd bits of machinery. Serious hold-ups at the paper mills

are caused by this practice. In one mill near London visited by a representative of the Association, production has dropped by 15 per cent. in recent weeks because of damage to plant from foreign matter such as tins and bottles and the necessity for frequently clearing out clogged machinery. Besides the loss in production there is the serious loss of valuable salvage, including paper which cannot be separated from rags, string, etc., to which it has adhered in the process of being pulped. In one mill a recent delivery of waste paper weighing 30 tons produced, after sorting, one ton of tins besides quantities of string and rubber.

Salvage of Rag, Rope and String

The Salvage of Waste Materials Order (No. 3) now in force makes it an offence to destroy or throw away any rag, rope or string or mix them with any other salvage. The maximum penalties are £100 fine or three months' imprisonment or both, on summary jurisdiction, or a £500 fine or two years' imprisonment, or both, on indictment. The Order does not prohibit or restrict the use of any rag, rope or string for manufacturing purposes, or for the purpose of saving property from immediate destruction or damage by fire.

Export Control

The Board of Trade has made an Order which will come into force on August 3rd, and will have the effect of making exports of all goods to South Africa and Southern Rhodesia subject to export licence. Under another Order made by the Board of Trade which will come into effect on the same date, all export licences for these destinations (other than licences issued to the respective High Commissioners, and to certain semi-official bodies) issued before July 3rd will be revoked.

The object of these Orders, which have been made after consultation with the Union and Southern Rhodesian authorities, is to restrict the export trade with these countries in order to bring it more closely into line with the limited shipping space available for commercial cargoes under present conditions.

Fatalities

The death of an engineman at Ashington (Northumberland) Colliery was stated at an inquest on July 14th to have been due to burns caused by a short-circuit in a power house. Mr. J. D. Morton, electrical engineer at the colliery, stated that he received a report of defects in the electrical plant from the deceased man, Albert J. Mitchison. He gave the necessary instructions and shortly afterwards was told that the lights were going out. He telephoned to the power-house but, receiving no reply, went over to investigate. He found a part of the building in flames and Mitchison told him that he had fouled some contacts. Witness rushed him away for treatment and the fire was controlled by means of an extinguisher. A doctor stated that before he died Mitchison told him that he had received a shock at 3,000 V. The coroner returned a verdict to the effect that death was caused by toxæmia following burns sustained from an electrical arc resulting from a short-circuit due to an unascertained cause.

While using a vacuum cleaner in a house at Burnbrae, Alexandria (Scotland) last week Mary Grant, a domestic servant, received a fatal shock.

A wire from a Hampstead house to a shed in the garden was the cause of the death of Mrs. Jeannette Goodfriend recently.

New Packing Regulations

The Control of Packaging (No. 1) Order which came into operation yesterday (July 23rd) covers the packing by manufacturers of a wide range of commodities. The packing materials concerned include paper, glass, metals, fibres and plastics and most commodities in general use, excluding foodstuffs, are affected. The purpose of the Order is to achieve savings in material, labour, plant and transport at present employed in the manufacture of containers and to reduce the labour and transport required in the distribution and retail sale of pre-packed goods. It will also prevent the indiscriminate substitution of certain types of containers for those which are already controlled. Restrictions are imposed on the printing and decoration of all the containers now to be controlled, and only two colours will normally be allowed. There is no intention to prevent the continued use of containers already in existence provided they are containers of a type generally in common use for that purpose earlier than 1941. The Order refers to the British Standards Institution Schedule No. 1048, 1942, which can be obtained (price 5s.) from the Publications Department, British Standards Institution, 28, Victoria Street, London, S.W.1.

Railway Substation Engineers' Cheese Ration

When the new rationing period starts on July 26th railway electrical substation staffs will become eligible for the special cheese ration granted to certain classes of workers.

Irish Zinc Oxide Production

It is reported by the *Irish Times* that the production of zinc oxide on a commercial scale has been commenced in Dublin by Industrial Gases (I.F.S.), Ltd., working along lines suggested by the Emergency Scientific Research Bureau.

Our contemporary says that "the day has been saved for the Electricity Supply Board which needed this product urgently for the manufacture of rubber cables." The production is said to be 10 cwt. a week.

Salvaging Scrap Metal

Even when its normal working life is over electrical apparatus provides a most valuable source of raw materials in a form which can readily be re-used in industry. To what a large extent this is true was made apparent to us recently by a visit to the Westbourne Park Coal & Iron Co., Ltd., scrap iron and metal merchants, London, where we also had the opportunity of seeing how largely electrical apparatus is employed in handling, breaking up, separating and generally preparing the scrap materials for further use.

There is, it seems, no end to the electrical equipment or pieces of equipment that can be seen at one of these yards—motors and generators; odd lengths of wire, conduits and copper

strip; transformers; cookers, kettles and other domestic appliances, perhaps from bombed houses; switchboards; meters; resistances; accumulators; fuse boards, etc.

Sorting, the first process, is in the case of the larger pieces of apparatus, done largely by hand, with the aid of cranes, but in the case of the collections of smaller articles, the separation of ferrous from non-ferrous metallic substances is assisted by the employment of electro-magnets. Sometimes, too, these are made use of purely for revealing the presence of iron or steel among collections of non-ferrous metals.

Much valuable copper, brass, cast-iron and steel, are recovered from old motors, generators, etc., which are broken up by hand, while tungsten steel is obtained from parts of old meters and magnetos. Special machines are used to strip off the covering of the larger cables, the cotton used for insulating the smaller gauge wires being burnt off. Old accumulator plates provide considerable quantities of serviceable lead. Miscellaneous iron and steel scrap is, of course, required for any number of purposes, and to reduce it to easily transportable dimensions, electrically-operated shears, of both guillotine and crocodile types, as well as oxy-acetylene cutters, are brought into service.

Breaking up old motors and generators for the recovery of copper, cast-iron and steel

At these scrap yards both the demand for their output and the "appetite" for raw materials, are insatiable. Supply authorities and electrical manufacturers are, therefore, asked in their own interests to dispose promptly of any waste or scrap materials they may have.

Apprentices for Building Industry

The National Federation of Building Trades Employers has adopted an apprenticeship scheme under which, after the war, every recognised builder will be required to engage a number of apprentices each year proportionate to the number of craftsmen he employs. Discussions are now to be held with the National Federation of Building Trades Operatives on the details of the scheme with a view to securing its endorsement. The scheme is intended to apply to the whole country.

Wolfram Production

To encourage the production of wolfram by individuals and small groups of workers, the Ministry of Supply is prepared to arrange to purchase small quantities of rough concentrates of an assay value down to 10 per cent. WO_3, on the basis of a price of 100s. per unit of WO_3 as 65 per cent. clean concentrates, less certain handling charges, and less an allowance for low grade material.

Arrangements have been made for the concentrates to be purchased by Non-Ferrous Minerals Development, Ltd., Plympton, on behalf of the Ministry of Supply, which is the sole authorised buyer.

Parcels of concentrates should be sent carriage paid to Plympton (G.W.R.) Station, addressed to Non-Ferrous Minerals Development Ltd., Plympton, Plymouth, who should be advised by letter.

Parcels will be weighed, crushed and sampled and the producer can be present, or represented, if he wishes. Assays of samples will be made.

Lighting Vehicle Steps

The Ministry of Home Security proposes to re-amend Para. 25 of the Lighting (Restrictions) Order, 1940, in order to permit the maximum lighting of steps on such passenger vehicles as tramcars and trolley-buses to be increased up to an intensity of 0.035 ft.-candle (formerly 0.005) at ground level within 3 ft. 6 in. of the step or platform edge. Such increased illumination should be obtainable by the use of a 36-W lamp bulb in place of the 6-W size hitherto employed.

Pacific Cable Board Dissolved

By Section 3 of the Imperial Telegraphs Act, 1929, it was provided that if the Pacific Cable Undertaking were taken over as mentioned in the Act the whole of the Pacific Cable Act, 1927, and the West Indian Islands (Telegraph) Act, 1934, should be repealed and the Pacific Cable Board dissolved. The two undertakings mentioned have now been taken over and the Board has been dissolved as from July 1st.

TRADE MARK APPLICATIONS

AMONG recent applications for British trade marks is the following, objections to which may be entered within a month of July 15th.

SESAME. No. 618936. Class 11. Electric hot plates for cooking. The General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2.

Wartime Estimating

Problems Arising Out of Present Conditions

By A. Unsworth

THOSE who are normally engaged in electrical manufacturing or contracting are doubtless well aware of the trouble in store for themselves if an order is secured at an unremunerative price, or conversely, if an order is lost on account of the price being above that of one's competitors. This is a risk the estimating engineer accepts in peacetime as being all in the day's work. To attain that nice balance between selling price and cost price which will secure the business and yet show a reasonable profit margin, a fine degree of judgment and knowledge of market conditions are essential.

Mr. Unsworth is senior estimating engineer in the Transformer Department of Johnson & Phillips, Ltd.

How much more is this true in wartime, with fluctuating raw material prices and labour rates. Let us take a typical case in point. A customer wishes us to quote, say, for equipment identical to some supplied to him in 1937. The uninitiated might consider this a fairly simple matter, and in normal times they would be right. All that would be necessary would be to turn up the record card of cost and selling price, making due allowance for any increase or decrease in the prices of raw materials and shop labour, usually not very considerable.

Factors affecting Cost

To-day, however, if you are one of those fortunate people whose records have not been removed to some safe area, you will still be able to refer to the appropriate costs, but only to find that they bear little relation to existing conditions. Certain component items may have been purchased abroad or may be now unobtainable, making it necessary to use substitutes. A rigid Government control of materials is exercised and licences will be required to purchase such materials in everyday use, as steel, cast-iron and copper.

Again, certain kinds of packing materials, such as zinc-lining and wood-wool, are difficult, if not well-nigh impossible, to obtain, and in those cases where packing is essential to prevent damage to delicate instruments, manufacturers are put to considerable trouble and expense to find substitute materials. The cost of nearly all materials used will have increased anything from between 25 and 50 per cent.

A completely new estimate will have to be got out, starting from scratch, and not forgetting to take into account the fact that non-skilled or partly-skilled labour only is available. Shop charges will have to be increased, due to labour awards. However, these represent a known quantity; more difficult to calculate are the additional charges resulting from overtime and men's bonus. In order to meet the delivery periods guaranteed it is often necessary to resort to overtime working, especially where priority orders are concerned.

Overhead charges, which in normal times remain fairly steady, in wartime perform notable acrobatic feats if not kept constantly in check. The necessity for insuring against war risks, and the accelerated depreciation of machine tools in use for 24 hours a day, are in part responsible. Where oncost represents a fixed percentage on labour charges, themselves greatly swollen, it is not uncommon to find the oncost charge higher than the material cost.

Export Contracts

When considering the export market, to all these minor difficulties of the estimator are now added a fresh set, resulting from increased freight charges consequent upon changed shipping routes and marine and war risk insurance variations. It has been found essential to incorporate in all tenders price adjustment clauses, which take such variations into account. Appropriate clauses have been formulated by the British Electrical & Allied Manufacturers' Association in conjunction with the principal firms engaged in the electrical industry, and are available for the benefit of manufacturers contracting to deliver machinery over a lengthy period.

Delays in manufacture due to more urgent work, or non-delivery of raw materials, are frequently the cause of increased prices. For instance, a job which in the usual way would take three months to execute may take double the normal time due to the priority system. During that time an increase in labour rates may come into force, which through no fault of the manufacturers will increase the shop charges by as much as 15 per cent. The customer will likewise argue that he has to wait longer for his goods, so why should he pay more because the manufacturer has exceeded his guaranteed delivery time?

Of late there has been considerable criticism of the "cost-plus" system as applied

to large contracts, on account of the opportunity for abuse which it affords to unreliable contractors. There is one aspect of its application, however, which has not hitherto been mentioned, namely, its suitability for repairs to damaged machinery where the full extent of the damage is not known. It is quite usual to undertake work of this nature on a "cost-plus" basis, thereby providing for contingencies, and it is generally agreed to be in the best interests of the customer himself.

ELECTRICITY SUPPLY

Ayrshire Dairy Demand.

Ayrshire.—DAIRY FARMING PROBLEMS.—Commenting on official reports regarding dairy farms in the county at the last meeting of the County Council a representative of an agricultural area said that there were difficulties encountered by dairy farmers which were not mentioned. He wondered if any member of the Council had ever visited a farm during milking hours at 5 o'clock on a dark morning when there was no light except oil lamps. Even if they visited the farm in the black-out while milking was going on they would agree with him that the lighting was totally inadequate and that something ought to be done. He moved the following amendment :—"That the County Council recommend to the Electricity Board that conditions as regards the installation of electric current be made as easy as possible to dairy farmers, particularly in present wartime black-out conditions." He added that electricity could also be used for cooling milk to the required temperature in the summertime while milking could be done to greater advantage by the use of electricity. Another member, in support, said that they had been making some progress in this matter before the war, but it had become completely stultified now, and a little push from the Council might help the Electricity Board to get along a little quicker. The amendment was agreed to unanimously.

Barrow-in-Furness.—SUPPLY TO WORKS.—The Electricity Committee is to provide a supply to a saw mill and basket works at a cost of £232.

LOAN.—Sanction is being sought to a loan for mains and services.

Mansfield.—MAINS AND SERVICES.—The Electricity Committee is seeking sanction to a loan for mains and services.

Middlesbrough.—SHELTER TARIFF.—The Town Council has approved a recommendation by the borough electrical engineer (Mr. H. Haigh) regarding electricity charges for the heating and lighting of shelters. The fixed charge is £5 7s. 6d. per annum per kW of maximum demand and the running charge ¼d. per kWh plus 0.01d. per kWh for every shilling by which the cost of coal exceeds 16s. a ton.

Stockton-on-Tees.—JOINT METER READINGS.—The question of joint readings for the Gas and Electricity Departments has been considered by the Town Council. A compromise has been reached regarding the working conditions in the two departments in order that they may be brought into conformity before any attempt is made to adopt a joint meter reading plan.

SUBSTATIONS.—Sites for the erection of electricity substations are under the consideration of the Town Council.

Wakefield Street Lighting.

Wakefield.—STREET LIGHTING DECISION.—After a long debate the City Council recently decided in favour of modified street lighting. In the course of the discussion Alderman A. Carr described Wakefield as an island of darkness amid a circle of towns possessing modified street lighting. A deputation on behalf of workers urged the resumption of lighting in view of the fact that a large number of people, many of them women and girls, were compelled by their employment to be out during the hours of darkness. Alderman W. H. Lindsay considered that street lighting would help morale. The recommendation in favour of lighting was, however, only adopted after an amendment that the question should be deferred for three months had been defeated by a narrow margin—21 votes to 20.

Watford.—LOANS.—Application is being made by the Electricty Committee for permission to borrow for mains and services, equipment and meters.

Overseas

Australia.—SUPPLY IN SYDNEY.—During the calendar year 1941 the Sydney County Council Electricity Department sold 760.4 million kWh compared with 697.8 million kWh in 1940, an increase of 9 per cent. The average price charged to customers decreased from 1.185d. to 1.155d., thus maintaining the downward trend of recent years. Net revenue was £151,074, compared with £28,576 in the previous year.

MAINTAINING SUPPLY IN QUEENSLAND.—The *Electrical Engineer & Merchandiser* states that an Order under National Security Regulations empowers the State Electricity Commission of Queensland to take any necessary action to ensure maintenance of supply in the event of war damage. The Commission has power to arrange transfer of labour or plant to damaged works; to determine priority of supply among consumers; and to ration or disconnect supply.

MELBOURNE REPORT.—In the area of the City of Melbourne electricity supply undertaking (city electrical engineer, Mr. B. Woodfull) electricity sales during the year ended September 30th last aggregated 153.4 million kWh, an increase of 5 per cent. on the previous year. Revenue per kWh sold was 1.335d. and expenditure 1.145d. In order that the total capacity of the generating plant should be available at the peak-demand period additions were made to the Porter plant and circulating water system.

Chile. — NATIONALISATION PLAN. — *Reuter* reports from Santiago that nationalisation of Chile's public transport and electric power services is recommended in a Bill presented to Parliament by the President and Cabinet. A message accompanying the Bill suggests that "National Societies" should be formed, in which the State would take part. These would, with State co-operation, develop the transport and electric services of the country.

Eire.—NEW HYDRO-ELECTRIC PROJECT.—The *Cork Examiner* reports that the Electricity Supply Board is starting a scheme for the harnessing of the Cummeragh River near the site of an old mill at Dromid, about five miles from Waterville. The site of the proposed power station is described as an ideal one, as the Cummeragh River drains the Derriana, Nahiska, Namona and Cloonaghlin high-altitude lakes as well as a number of mountain loughs. The scheme will be linked with the Shannon system at Killorglin.

TRANSPORT

Canada.—PROPOSED TORONTO SUBWAY.—When, in order to lessen congestion and permit of service acceleration, plans for the construction of two new tram routes on reserved track were placed before the Toronto ratepayers last year the scheme was defeated. *Modern Transport* reports, however, that new plans have now been prepared. They include the construction of subways running north-south and east-west, with the complete withdrawal of surface tracks along these routes. In addition, four new sections of reserved surface track are suggested, one along the route previously proposed. The Toronto Transportation Commission does not anticipate the immediate putting into effect of the scheme, but points out that definite long-term planning is essential to orderly development. It is considered quite practicable to finance the scheme if it is carried out in stages over a period of twenty years, and the Commission is prepared to contribute towards the cost.

Spain.—ELECTRIC RAILWAY.—The *Engineer* reports that after lying derelict for nearly seven years, the Calahorra and Amedo narrow-gauge line has been reopened to traffic, this time with electric traction. Calahorra is about 135 miles from Bilbao, on the Bilbao and Zaragoza main line, and the Amedo branch serves a southern district.

RADIO & TELEPHONY

Brazil.—ITALIAN CONCERN TAKEN OVER.—*Reuter* reports from Rio de Janeiro that the Brazilian Government has decided to take over the services and equipment of the Italian Submarine Cable Co., placing it under the control of the Posts & Telegraphs Departments.

Chile.—STORM DAMAGE.—Telegraphic communication between Santiago and towns in the south of Chile was recently cut off by a violent storm. A wind of cyclonic force hit Santiago, damaging roofs and tearing up telegraph poles. *Reuter.*

Great Britain.—RADIO RELAY STATISTICS.—At March 31st last, there were 387,234 subscribers to 278 radio relay exchanges, compared with 369,420 subscribers to 278 exchanges at December 31st, 1941.

Legislation in Ulster

Electricity Bill Passes Committee Stage

IN the Stormont Parliament on July 16th, the Minister of Commerce, Sir Basil Brooke, said that the new power stations being erected in Northern Ireland would be de-rated, but the position after the war, when they would be handed over to other authorities, was being considered, the stations being emergency ones. The stations would be derated because the Government wanted cheaper electricity. It was proposed that existing stations should continue to pay rates as it would be a hardship on local authorities if they did not do so. When the present emergency was over he was sure that that viewpoint would be borne in mind.

Dealing with a clause regarding electricity in bulk in the Electricity (Emergency Supplies) Bill before the House, Sir Wilson Hungerford, Parliamentary Secretary, said that the tariff contemplated introduced a main safeguard which had been pressed by Belfast Corporation. It ensured that a proper price would be charged for the supply given by the Ministry to any other undertaking. It would ensure that any certified deficiency in respect of the Ministry's operations would be a figure which could be properly accounted for. The clause was passed.

Mr. H. Midgley moved an amendment that in the event of the Ministry transferring to Belfast Corporation a new emergency station and main transmission lines connecting it with Belfast, the transfer price should not exceed the cost to the Corporation of installing plant with a capacity of 30,000 kW at the Belfast station, such cost not to exceed £480,000.

Sir Basil said that the amendment could be applied to peacetime policy and should be left until the re-allocation after the emergency. Belfast Corporation was being fully reimbursed for the dispersal being carried out by its Department.

The amendment was defeated by 15 votes to 4.

An amendment by the Minister implementing a promise that the Ministry would not acquire stations after the close of the emergency period was agreed to. Sir Basil gave an assurance that the Ministry had every intention of using the whole of the electricity resources without favour to any particular district.

Major Sinclair, Financial Secretary, moved the financial resolution to cover the administrative expenses of the Ministry acting as electricity undertakers and any costs which might be met in the first instance by the Government in salaries, wages, compensation to personnel, rent, insurance and management generally with generating stations to be acquired or constructed pending recoupment out of the levy which was provided for in the Bill. He said that one part of the resolution empowered the Ministry of Finance to make advances up to £1,000,000. The resolution was agreed to and the Bill passed the Committee stage.

Deduction or Induction?

How to Handle Statistics

By P. Schiller

WHEN attempting to look into the future two methods are available, *viz.* (1) to build up a picture from components that appear individually susceptible of prediction or (2) extrapolate the general trend from experience made in the past : in short, the inductive and the deductive methods. In the sphere of electricity supply an excellent example of the inductive method is the memorandum prepared by the late Sir John Snell for the purpose of the Weir Report which led to the 1926 Electricity (Supply) Act. Its anticipation of ten years' development has been verified by the facts to an amazing degree.

Masking and Transitory Factors

The valuable statistical material collected and published by the Electricity Commission however, has led to extensive application of the deductive method, and there is hardly any branch of electricity supply economics in which attempts have not been made to utilise these returns for predicting future developments or evolving recommendations as to policy. But in order to discover the actual trend, masking and transitory factors must be eliminated. This has not always been observed, and, in addition, assumptions have sometimes been made which have proved fallacious. Some illustrations are given below.

All statistics dealing with costs of supply should be corrected for the influence of fluctuations in the prices of labour and materials, or, generally, in the purchasing power of the currency. For instance, the total capital expenditure on present generating plant is the integral over a period during which prices varied within the range of perhaps 1 to 3, certainly 1 to 2, and the picture will be further distorted by the substantial rise in price level accompanying and following the present events.

A Typical Example

Typical of transitory factors insufficiently considered is the connection during the last pre-war decade of millions of existing domestic premises to the supply mains. This process has inflated the distribution component of the total costs. But it is obvious that once all accessible existing premises have been connected the total number of domestic consumers can increase only in the measure the total number of households increases, and if the population does not grow, each addition of a new house or consumer must be accompanied by the disappearance of an existing one. With three-fourths of the houses already connected, the effect of this transitory element of distribution-cost inflation is clearly going to diminish. Costs of electricity distribution have often been averaged out on the total number of units sold. However, from Table 37 of the Electricity Commission's 15th Returns it has become apparent that roughly one-third of the total number of units is sold at high-voltage, *i.e.*, without passing the l.v. distribution systems, which are responsible for the bulk of the aggregate distribution costs. Hence, capital expenditure on distribution, as well as distribution costs per unit sold, should be related primarily to units sold at low voltage.

Table 37 also for the first time has revealed the structure of the composite figures for " units sold for lighting, heating and cooking " given in the Returns. It showed that in 1937–38, after intensive development of the domestic load, only about 60 per cent. of units classified as " lighting, heating and cooking " were due to domestic uses, whereas previously the total of the composite figures had repeatedly been identified with domestic consumption. These few illustrations show how difficult it may sometimes be to draw reliable inferences from statistical returns, and how easily one may be misled.

Suggested Investigation

Without detracting from the immense potential value of statistics relating to electricity supply, it is legitimate to suggest that more attention might advantageously be paid to the inductive method of looking ahead.

Taking a concrete subject, the costs of supply of electricity for domestic purposes, it would be very enlightening if an investigation were made of the case of some existing supply undertaking, to comprise an estimate of the potential ultimate load densities based on experience gathered from modern electrified housing estates and " cold snap " reports, and a calculation of what it would actually cost to reconstruct the whole distribution system so as to be capable of coping with these potential demands. The total estimated costs of distribution thus arrived at, together with the more easily estimated costs due to generation and transmission, would allow a clearer picture to be formed of the aspects of domestic electrification than any statistical extrapolation attempted hitherto.

Indian Supply Conditions

The Status of the Calcutta Undertaking

By G. O. McLean, M.Eng.

DESPITE the thousands of miles which separate us from Calcutta, India, and particularly Bengal, is now our eastern frontier which must be defended, and India must now become the arms factory for the East, which means that it must have an adequate power supply.

The first licence, to supply a small area of 5 sq. miles in Calcutta, was granted by the Bengal Government at the end of 1896, and supply commenced in 1899. The demand has always exceeded expectations, and extension after extension has had to be undertaken. Thus completely new generating stations were opened in 1902, 1906, 1909, 1912, 1926 and 1938.

To-day the three major generating stations could carry 250,000 kW, and the sites are capable of expansion to 500,000 kW, the present demand being over 150,000 kW. Energy sales total nearly 500 million kWh per annum.

Besides well chosen sites, the generating stations have moderate steam pressure and temperature conditions, and so can be rapidly expanded when necessary without delays due to manufacturing difficulties. Naturally the three stations are tied together —by 33 kV lines, that being the generating pressure at the new station while the older ones generate at 6 kV.

Transmission System

The present staff is responsible for about 600 miles of e.h.v. lines, and 2½ times that length of l.v. distributors. This is in a supply area of 120 sq. miles and not the original 5 sq. mile area. Normal British practice is followed with regard to sizes and types of cable, and also pressures and frequency, so that again there are no delays in obtaining material due to manufacturing difficulties. Despite the transmission distances, overhead lines are limited to l.v. distributors in the outlying districts, experience having shown that for continuity of supply in tropical storms, the main transmission lines are better underground. The numerous static substations vary from an attended 20,000-kVA switching and transforming station, down to outlying 500-kVA stations with two or three outgoing feeders.

There are only 65,000 consumers in a population of two million, but the Hindus remain in large family groups, so that one house (representing one consumer) may contain five or six adult sons, each with his own family. Similarly, the supply to a whole block of ten or twenty small "bazaar shops," or even living huts or "bustees," may pass through the meter of a landlord. Then 70 per cent. or more of the population have no need of, or sufficient cash to pay for, electricity. The sales to domestic consumers exceed 1,000 kWh per annum each, though the load principally consists of lighting and fans. There is no doubt that the number of consumers, and the annual consumption per consumer, could soon be multiplied by two or three when sufficient plant becomes available to enable sales to be fostered, as it should be understood that the only domestic tariff is a flat rate (just below 2d. per kWh) and this, though possessing the advantage of simplicity for simple people, does not possess the promotional elements of the English two-part domestic tariff.

Metering Methods

Metering, as one might expect, has been kept as simple as possible. A single kWh meter meets each domestic consumer's requirements, while the large power consumer has in addition a kVA demand meter, and pays on a two-part tariff. The demand is measured over two hours and not half-an-hour as is usual here, and this eliminates complaints about demand charges being based on starting currents, as the starting up of a huge jute mill may spread over half-an-hour or more.

Before concluding, a word must be said about conditions. Naturally, one would expect these, being tropical, to be, let us say in the boiler house, well approaching the "infernal"; or jointing out in the sun when the temperature is 110 deg. F. or more in the shade, to be at least "sticky." But in Calcutta at least, what can be done has been done to alleviate conditions.

The boiler houses are open to the elements, except for a substantial roof, and so one can generally find a coolish spot to have a breather and mop one's brow, and even boiler internal surveys are taken in one's stride, when a bath, clean clothes, and a long cool drink follow. Flooding possibilities (the monsoon sometimes means 10 in. of rain in less than an hour) as well as temperature conditions, rule out the use of basements, and so there are no "glory holes" for ashwheelers, etc. Offices, and laboratories and control rooms are naturally clean, well ventilated, and cooled, while in the latest control room there is complete air conditioning, humidity control being given special attention. For the outside staff, transport and abundant assistance are provided to make things as easy as possible.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

General Electric Co., Ltd.—In its report for the year ended March 31st, the company shows a profit of £1,725,137 as compared with £1,722,643 in the previous year, to which is added £812,791, making a total of £2,537,928. From this are deducted depreciation (£460,795), directors' fees (£4,485), contribution to pension fund (£78,911), the dividends on the 6½ per cent. "A" preference and 7½ per cent. "B" preference stocks (£126,000) and transfer to income tax reserve (£685,000). It is again proposed to pay a dividend of 10 per cent. less tax, on the ordinary stock for the year, and also to repeat the bonus of 7½ per cent. less tax, leaving a balance to be carried forward of £815,379.

The report states that the company has had another successful trading year, but the incidence of E.P.T. reduces the net result to that of the standard period. The demand for the company's products has continued unabated, and the works have been fully employed. Research activities have been maintained at a high level. The volume of export business has been satisfactory in view of all the difficulties of present conditions. All the overseas companies had a good trading year, though activities in China, Malaya and Burma have been temporarily interrupted by enemy occupation. All losses sustained in these territories have been provided for in the accounts. The company's employees at March 31st totalled 52,535, and in addition there are nearly 4,000 serving with the Forces.

In a statement issued with the report and accounts Lord Hirst (chairman and managing director) says that the whole of the company's manufacturing organisations are doing their utmost to bring their full capacity to bear, and the whole knowledge and skill of the administrative, technical and manufacturing staffs are engaged in development, design and production to meet the essential needs of to-day. An ever-increasing volume of production has been obtained, a decrease in some departments, due to Government restrictions, being more than offset by an increase in others. Every effort has been made to retain the goodwill of customers. The activities of the research laboratories have continued with undiminished vigour and have borne good fruit, both in the company's and in the national interest.

The losses suffered in the Far East are somewhat severe, though foreseeing the danger they considerably reduced their commitments in that part of the world.

While the company's efforts must necessarily be concentrated on present needs, it cannot afford entirely to neglect the future, and is doing what it can to plan for the post-war period. The E.P.T. at 100 per cent. deprives it of the opportunity for the needs and difficulties which will follow the war. In a big company, great activity, such as exists to-day, inevitably means that additional expenditure will have to be incurred in many directions which is not allowable as a deduction for tax, but which has to be written off from the year's profits. Such provisions as these fall, therefore, entirely on the net profits and in this year, coupled with the increased taxation, have prevented the company from placing any sum to provision for war contingencies as was done last year.

To-day one is apt to hear only the criticisms, generally made without the full knowledge of the facts, now management, now workpeople. There is too much emphasis on deficiencies which are exceptional, and too little on achievements, which are general. Lord Hirst pays tribute to both management and worker.

W. T. Henley's Telegraph Works Co., Ltd., held its annual meeting on July 17th, when Sir Montague Hughman (chairman), who presided, in the course of his speech said that he was glad to report satisfactory progress in the company's business during 1941 ; the turnover had again reached record figures. The percentage of profit earned showed quite an appreciable reduction and as all their work was in connection with national requirements he did not think that stockholders would grumble at the fact that in a year of record turnover they had not maintained the former rate of profit.

Last year he mentioned the greatly changed circumstances of their business and these had continued throughout the year under review. Whilst he could not give details, the record output had only been obtained by the sustained efforts of their staff and workpeople notwithstanding the many difficulties brought about by war conditions. They were employing an increasing number of women, many of whom were doing work in different departments of their factories in what were formerly looked upon as jobs for men only. A works council had been formed at each of their works. They continued to make allowances to those who were in the Services, and they still maintained the pension funds.

Their rubber cable works had carried out very important work during the year, and notwithstanding many difficulties, the volume of business completed amounted to a substantial figure. The year proved an exceptional one for their paper cable works, the hours worked showing a large increase, and their engineering department had been working to capacity. The contract department had been fully engaged during the whole of the year, and a large number of important contracts had been completed.

On the technical side of their business the increasing scarcity of many basic raw materials had called for ingenuity on the part of the technical department in the construction of standard designs to suit the new conditions and great activity in the research laboratories in the production of alternative materials. The business of their overseas branches had suffered during 1941 owing to restriction upon exports, but as the branches had ample stocks in hand at the beginning of the year, the reduction in turnover was less severe than might have been expected. In 1940 their overseas trade was over 28 per cent. of their total business. In 1941 this was reduced to 25.3 per cent., and they must expect a lower proportion in the future.

The Henley Tyre & Rubber Co. had had a busy year with a record output of tyres and other

rubber manufactures. Their South African company had met with difficulties similar to those experienced at their overseas branches. Nevertheless it had done a considerable amount of business and showed a satisfactory profit. The Holborn Construction Co. had also had a profitable year.

Electric Construction Co., Ltd.—Presiding at the annual meeting held on July 16th, Mr. G. W. Spencer Hawes (chairman) said that the works had been fully occupied throughout the past year and the accounts presented an agreeable view of the financial position. A greater volume of business had yielded increased profits, and although the more arduous employment of the plant and equipment had involved a large expenditure on maintenance, the available surplus after allowing for the preferential dividend amounted to £121,189. As the company's superannuation scheme had been found to be narrow in scope, a modern and comprehensive scheme of contributory pensions for the benefit of the staff and workpeople had been inaugurated.

Thomas Bolton & Sons, Ltd., report a profit for the year ended March 31st of £162,152, as compared with £161,852 in the previous year, to which is added £77,822 brought in, making £239,974. After providing for depreciation of fixed assets (£78,838), directors' remuneration (£2,479) and debenture interest and dividends already declared (£45,500), it is proposed to place £10,000 to war contingencies reserve and to pay a final ordinary dividend of 5 per cent., again making 7½ per cent. for the year and leaving £78,157 to be carried forward.

Christy Bros. & Co., Ltd., state that the profit for 1941–42 was £53,238, as compared with £40,262 in the preceding year. After meeting income tax, loan interest, etc., putting £15,000 (against £10,000) to general reserve and adding £23,342 brought forward, an ordinary dividend of 12½ per cent (11 per cent.) is being paid and £25,759 is carried forward. The subsidiary, Christy Bros. (Wireless Relays), Ltd., showed a greatly increased profit and raised its dividend from 6 to 10 per cent.

The Metropolitan Electric Cable & Construction Co., Ltd., reports a net profit for 1941 of £37,945, as compared with £33,996 for 1940, to which is added £1,503 brought in making £39,448. From this is deducted taxation, £18,500, and transfer to preference share reserve, £10,000. It is proposed to pay a final ordinary dividend of 5 per cent., making 7½ per cent. for the year (same), leaving £3,973 to be carried forward.

Hick, Hargreaves & Co., Ltd., report a net trading profit for the year to March 31st of £41,358, as compared with £37,809 for 1940-41, and a net profit of £31,815 (£27,063). The contingency fund receives £5,000, and, as already announced the final dividend is raised to 8 per cent., making 10 per cent. for the year (against 7 per cent.), and the balance carried forward is £7,403 (against £4,587 brought in).

The Delhi Electric Supply & Traction Co., Ltd., reports a net revenue for 1941 of £60,010, as compared with £55,988 for 1940, and after deducting miscellaneous and administration expenses, and adding £24,544 brought in, the balance available is £80,310. A sum of £18,600 is placed to depreciation and renewals reserve, and reserve for taxation receives £19,000. The final dividend is 5 per cent., again making 9 per cent., tax free, for the year and £24,710 is carried forward. The sales of electricity increased from 14.9 million kWh to 16.9 million kWh, and the number of passengers carried from 14.5 to 18.3 millions.

Veritys, Ltd., announce that the net profit for the past year was £52,590, as compared with £49,048 for 1940. The reserve again receives £10,000 and after meeting taxation, etc., and maintaining the dividend at 7½ per cent., a balance of £4,547 (against £4,324) is carried forward.

W. & T. Avery, Ltd.—The net profit for 1941–42, after providing for taxation, depreciation, etc., was £130,407, against £130,661 for 1940–41. The directors have again transferred £10,000 to general reserve and £45,000 to war contingency reserve and the ordinary dividend is maintained at 15 per cent.

Crossley Bros., Ltd., report a profit of £67,733 for 1941–42, after allocating £20,000 to depreciation, against £48,808 in 1940–41. From this £20,000 (against nil) is provided for taxation and £10,000 (same) is placed to general reserve. The deferred ordinary dividend is maintained at 5 per cent. and £35,670 (against £34,815) is carried forward.

Crossley-Premier Engines, Ltd., report a profit of £46,041 for 1941–42 (against £42,897). The ordinary dividend is maintained at 10 per cent.

The Nico Light Co., Ltd., is paying a dividend of 7½ per cent., less tax, for the year to March 31st. In the previous year the dividend was 5 per cent.

The Globe Telegraph & Trust Co., Ltd., has announced a final dividend of 2 per cent., making 5 per cent. net, for the year (against 6 per cent.).

Bennis Combustion, Ltd., has declared a final dividend of 5 per cent. again making 10 per cent. for the year.

Dublin United Transport, Ltd., is paying an interim dividend of 2 per cent.

Radiovisor Parent, Ltd., reports a loss of £1,670 for the year to March 31st (against a loss of £2,668 in the previous year), making the debit carried forward £35,081. The report states that sales show an increase of 50 per cent.

Redfern's Rubber Works, Ltd., are again paying an interim dividend of 3¾ per cent.

New Companies

C. H. Wileman, Ltd.—Private company. Registered July 11th. Capital, £1,000. Objects: To carry on the business of radio engineers and specialists, to carry out any transactions relating to wireless telegraphy and telephony, television, tele-photography and allied sciences or arts; electrical contractors and engineers, dealers in lighting, cooking and power units, etc. C. H. Wileman, 1302 Pershore Road, Stirchley, Birmingham, is the permanent managing director. Solicitors: Price, Atkins and Price, 71, Temple Row, Birmingham, 2.

Linaglow, Ltd.—Private company. Registered July 11. Capital, £1,000. Objects: To carry on

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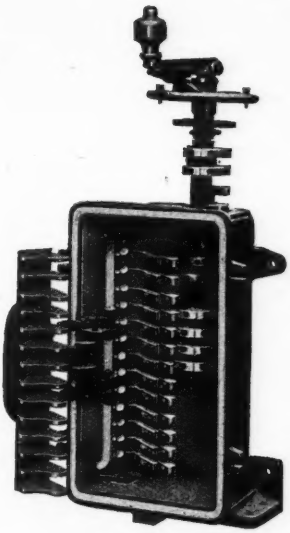

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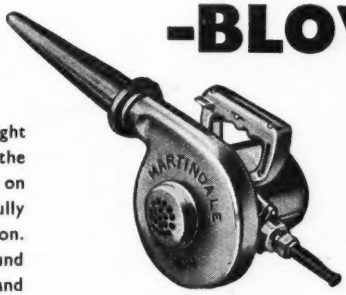

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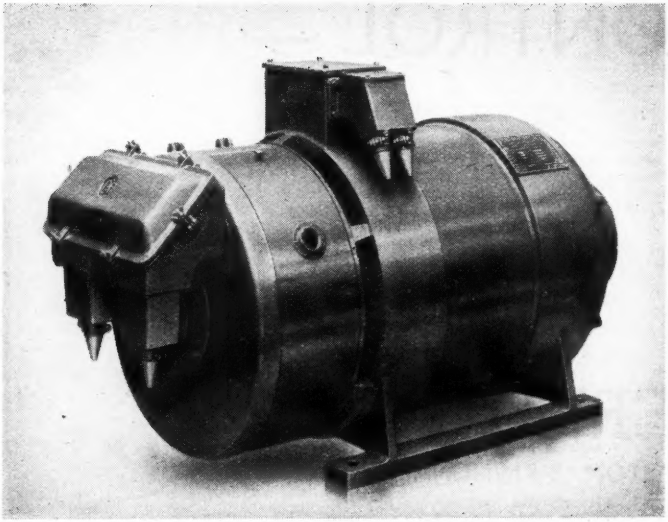

The 'N-S' VARIABLE-SPEED A.C. motor can be supplied *totally enclosed*

Unlike other variable-speed A.C. commutator motors, there is no difficulty in supplying the 'N-S' motor in totally enclosed form. A large proportion of the losses, as in a standard induction motor, are in the stator, not the rotor, and the heat can be dissipated readily by the efficient 'Emcol' cooling system.

Mechanically, the 'N-S' motor is a perfectly straightforward machine with fixed brushgear. For commutation and brush life it is the equal of a good D.C. motor and needs as little maintenance. It is available for outputs and speed ranges to suit the great majority of variable-speed drives.

The illustration is of a 75/24 H.P., 1475/950 R.P.M. 'EMCOL' totally enclosed 'N-S' motor for boiler fan drive.

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the business of manufacturers, importers, exporters, distributors and repairers of and dealers in dynamos, motors, armatures, batteries, accumulators, lamps, bells, wireless sets and accessories, etc. Subscribers: Mrs. Kathleen Linton and Frederick G. Linton, both of 9, Lonsdale Drive, Enfield. Registered office: Lonsdale Drive, Enfield, Middlesex.

Colne & District Radio Relay Services, Ltd.—Private company. Registered July 6th. Capital, £500. Objects: To establish and operate relay stations, etc. Directors: H. Boocock (governing director and chairman) and C. Boocock, both of 210, Skipton Road, Colne, Lancs. Solicitor: H. Wilkinson, 1, Sidney Terrace, Trawden, Colne.

Companies Struck off Register

The names of the following companies have been struck off the Register and they are thereby dissolved:—Alandale Radio & Television Co., Ltd.; Essex Radio Supplies, Ltd.; Lancashire Electric Sign Construction Co., Ltd.; London Electric Service, Ltd.; Miller & Co. (Radio), Ltd.; Neon Installations, Ltd.; Picton Electrical Patents, Ltd.; Ridgelite Electric Co., Ltd.; Southern Globe Electrical Co., Ltd.; Kingswood Electric Supply Co., Ltd.; Westminster Wholesale Electrical Co., Ltd.; Metcalf Electrics, Ltd.; Spreadborough Electrical, Ltd.; and Tungsten Contacts, Ltd.

Companies to be Struck off Register

The names of the following companies will be struck off the Register at the expiration of three months unless cause is shown to the contrary:—Allsop Telephone Installing Co., Ltd.; Belmont Radio & Television, Ltd.; Bogota Telephone Co., Ltd.; Electrolines, Ltd.; Emerson Radio & Television Co., Ltd.; and Silva Streem Radio Manufacturing Co., Ltd.

Companies' Returns

Statements of Capital

Exide Services, Ltd.—Capital, £100 in 100 ordinary shares of £1 each. Return dated April 6th. All shares taken up. £100 paid. Mortgages and charges: Nil.

Electroway Heaters, Ltd.—Capital, £3,000 in 3,000 shares of £1 each. Return dated March 16th. 2,660 shares taken up. £2,660 paid. Mortgages and charges: Nil.

Theco Electrical Appliances, Ltd.—Capital, £1,000 in £1 shares. Return dated December 31st, 1941 (filed May 13th, 1942). 751 shares taken up. £751 paid. Mortgages and charges: Nil.

Willans & Robinson, Ltd.—Capital, £100 in £1 shares. Return dated January 7th (filed May 15th). 2 shares taken up. £2 paid. Mortgages and charges: Nil.

Sussex Electricity Supply Co., Ltd.—Capital, £197,000 in 197,000 shares of £1 each. Return dated May 6th. All shares taken up. £197,000 paid. Mortgages and charges : Nil.

Newmarket Electric Light Co., Ltd.—Capital, £30,000 in £10 shares. Return dated May 13th. 2,656 shares taken up. £26,560 paid. Mortgages and charges : £14,200.

Electric Ignition Laboratory, Ltd.—Capital, £2,000 in 2,000 ordinary shares of £1 each. Return dated March 16th. 1,500 shares taken up. £1,500 considered as paid. Mortgages and charges: Nil.

Tudor Accumulator Co., Ltd.—Capital, £100,000 in 10,000 shares of £10 each. Return dated April 13th. All shares taken up. £29,000 paid. £71,000 considered as paid. Mortgages and charges: Nil.

W. Monks & Co., Ltd.—Capital, £1,500 in £1 shares. Return dated December 31st, 1941 (filed April 2nd, 1942). All shares taken up. £750 paid. £750 considered as paid. Mortgages and charges : Nil.

Metropolitan-Vickers Electrical Co., Ltd.—Capital, £250,000 in £1 shares. Return dated March 26th. 10,002 shares taken up. £10,002 paid. Mortgages and charges : Nil.

Idealite, Ltd.—Capital, £1,000 in £1 shares. Return dated July 30th, 1941 (filed March 31st, 1942). 2 shares taken up. £2 paid. Mortgages and charges : Nil.

H. J. Cash & Co., Ltd.—Capital, £25,000 in £1 shares. Return dated March 26th. 20,000 shares taken up. £15,000 paid. £5,000 considered as paid. Mortgages and charges : Nil.

Increase of Capital

Electrical Utilities, Ltd.—The nominal capital has been increased by the addition of £4,000 beyond the registered capital of £1,000. The additional capital is divided into 3,000 ordinary and 1,000 non-cumulative non-redeemable preference shares of £1 each.

Mortgages and Charges

Underwood (Electric), Ltd.—Assignment on July 2nd, 1942, of contract moneys, to secure all moneys due or to become due from the company to Martins Bank, Ltd., not exceeding £6,900.

Grierson, Ltd.—Charge on contract moneys, dated June 29th, 1942, to secure all moneys due or to become due from the company to Westminster Bank, Ltd.

Automobile Electrics, Ltd.—Issue on July 3rd, 1942, of £600 debentures, part of a series already registered.

Bankruptcies

G. A. Weston, electrical contractor and engineer, 5–6, Roman Wall House, Crutched Friars, London, E.C.3.—First and final dividend of 1s. 6½d. in the £, payable any day (except Saturday) at Bankruptcy Buildings, Carey Street, London, W.C.2.

Liquidations

Corporation of Electric Transport, Ltd.—Meeting August 18th at 2, Norfolk Street, Strand, London, W.C.2, to receive an account of the winding-up by the liquidator, Mr. B. J. Davis.

Voltalite, Ltd.—Meeting August 19th at 37, Brown Street, Manchester, 2, to receive an account of the winding-up by the liquidator, Mr. F. S. Burman.

STOCKS AND SHARES

TUESDAY EVENING.

THE general atmosphere of Stock Exchange markets is one of subdued cheerfulness. The character of the war news from the Russian front has not been conducive to complacence, but prices of stocks and shares are now divorced to some extent from the war reports, being governed more by financial considerations than by military events. The prospect of an early withdrawal of the present War Loans available to the public, and the substitution of others bearing a less favourable rate of interest, is having a marked effect upon gilt-edged values as a whole and indirectly, of course, upon shares of lower rank. At the same time, prices of preference shares which recently reached somewhat unduly high levels, have gone back to a slight extent. There is a fair amount of business doing in most markets round the House, although, as mentioned on previous occasions, were there more stock for supply to prospective purchasers, greater activity would be encouraged.

Transport "C"

For several weeks past, the price of London Passenger Transport "C" stock has varied between 40 and 41. By comparison with the junior stocks of the other four railway companies, the return offered has been relatively modest. Within the past few business days, however, demand has sprung up for Transport "C." This led to the assumption that a substantial amount held in a deceased account has now been realised. By looking well ahead, it is possible to visualise a substantially higher price for the stock, although this must rest upon possibilities which are at present difficult to gauge. The Board's prior-charge stocks are practically unchanged in price. Notice has been given that the 12½ millions of "Trade Facilities Acts" stock, dated 1942-72, will be paid off on January 1st next. This will save sufficient interest to enable a higher rate to be paid on the "C" stock.

Dividends and Reports

The General Electric Co. had been expected to repeat its last year's dividend of 17½ per cent., so when the announcement appeared last Friday, no surprise was expressed, nor did the price of the shares vary from the previous 81s. The company is doing all that can be expected of it, and the high price of the ordinary shares is the best tribute that could be desired to the respect in which they are held by investment.

A company which has reduced its dividend is the Oriental Telephone Co., whose distribution has come down to 10 per cent. from 16 per cent. for the previous year. The company recently sold most of its Indian interests to the Government of India, retaining its interests in Shanghai, Hongkong and Singapore. These are assumed to be in enemy possession, but the company has the substantial sums of money paid to it in respect of the Indian companies just mentioned. It is, indeed, somewhat surprising that it should be able to pay as much as 10 per cent. The price of the shares is unchanged at 47s. 6d. Electric Constructions remain at 34s. 6d., the meeting having no effect upon the price of the shares. The chairman stated that the works had been fully occupied during the year under review, and that the accounts presented an agreeable view of the financial situation.

Price Fluctuations

Revo Electric increased its profit for the year ended March 31st last by no less than £114,500, but the whole of this went in taxation and the net profit of £54,317 is only about £800 up. As already announced, the dividend of 15 per cent. is unchanged, but the bonus of 2½ per cent. goes against 5 per cent. in the preceding year. The price is ex dividend at 28s. 9d. for the 10s. shares, giving a yield of £6 1s. 9d. per cent. on the money. Falk, Stadelmann are 1s. 9d. higher at 23s. 9d.; Murex at 93s. 9d. are 1/16 up; Telegraph Constructions at 43s. 9d. have regained the deducted dividend of 1s. less tax; Greenwood & Batley at 30s. are unaffected by the dividend, making 15 per cent. for the year; and Babcock & Wilcox are a few pence lower at two guineas. Foreign bonds maintain their attraction. Mexican Light & Power firsts are up 2½ to 87½. South Brazil Electric 6½ per cent. bonds have put on several points, to 63. Even Tokyo Electric sixes are 1 higher on the week, at 13.

Fuel Rationing Prospects

Having filled up and despatched their fuel questionnaires, people are asking what practical advantage may be expected from a scheme officially estimated by the Government to cost £750,000 in its first operation and to save ten million tons of coal. Scarcely a change has taken place in the prices of stocks and shares as an effect of the proposals. The Home electricity supply list is practically unaltered as compared with a week ago. County of London ordinary are 6d. down at 37s. Some of the 6 per cent. preference shares are easier, but the ordinary hold their previous ground. Amongst overseas shares, Palestine Electrics are a better market at 21s. 3d. on the rise in the gross revenue shown by the annual report.

Globe Telegraph Dividend

The Globe Telegraph & Trust Company has declared a final dividend for the year of 2 per cent., making 5 per cent. for the twelve

(*Concluded on page* 132)

ELECTRICAL INVESTMENTS

Prices, Dividends and Yields

Company	Dividend 1939–40	Dividend 1940–41	Middle Price July 21	Rise or Fall	Yield £ s. d.
Home Electricity Companies					
Bournemouth and Poole	12½	12½	52/6	..	4 15 0
British Power and Light	6	6	28/–	..	4 5 9
City of London	7	7	27/6	..	5 1 9
Clyde Valley	8	8	40/–	..	4 0 0
County of London	8	8	37/–	–6d.	4 6 6
Edmundson's:					
7% Pref.	7	7	34/6	..	4 1 2
Ord.	6	6	28/–	..	4 5 9
Elec. Dis. Yorkshire	9	9	42/–	..	4 5 9
Elec. Fin. and Securities	12½	12½	48/9	..	5 2 6
Elec. Supply Corporation	10	10	45/–	..	4 9 0
Isle of Thanet	2	Nil	11/3	..	—
Lancs. Light and Power	7½	7½	34/6	..	4 7 0
Llanelly Elec.	5½	5½	22/6	..	4 17 9
Lond. Assoc. Electric	4½	4	19/6	..	4 2 1
London Electric	6	6	25/–	..	4 16 0
London Power Red. Deb.	5	5	105½	..	4 14 7
Metropolitan E.S.	8	8	35/9	..	4 9 6
Midland Counties	8	8	38/9	..	4 2 6
Mid. Elec. Power	9	9	42/–	..	4 5 9
Newcastle Elec.	7	7	28/9	..	4 17 5
North Eastern Elec. Ordinary	7	7	31/3	..	4 9 7
7% Pref.	7	7	34/–	..	4 2 4
Northampton	10	10	47/–	..	4 5 1
Notting Hill 6% Pref. (£10)	6	6	9	..	—
Northmet Power:					
Ordinary	7	7	35/9	..	3 18 4
6% Pref.	6	6	31/–	..	3 17 5
Richmond Elec.	6	6	25/–	..	4 16 0
Scottish Power	8	8	39/6	..	4 1 0
Southern Areas	5	5	20/–	..	5 0 0
South London	7	7	26/6	..	5 5 8
West Devon	5	5	22/6	..	4 9 0
West Glos.	4½	3½	20/–	..	3 10 0
Yorkshire Elec.	8	8	40/–	..	4 0 0
Overseas Electricity Companies					
Atlas Elec.	Nil	Nil	4/3	..	—
Calcutta Elec.	7*	7*	25/–	..	5 12 0
Cawnpore Elec.	10	10	26/3	..	7 12 4
East African Power	7	7	27/–	..	5 3 8
Jerusalem Elec.	7	5	17/6	..	5 14 4
Kalgoorlie (10/–)	7½	5	7/6	..	6 13 4
Madras Elec.	6*	4*	18/9	..	4 5 4
Montreal Power	1½	1½	24½	+½	6 2 5
Palestine Elec. "A"	Nil	4*	21/3	+1/6	3 15 3
Perak Hydro-elec.	6	7	7/6	..	—
Shawinigan Power	83cts.	90cts.	14	..	—
Tokyo Elec. 6%	6	6	13	+1	—
Victoria Falls Power	15	15	72/6	..	4 2 8
Whitehall Inv. Pref.	5	5	15/9	..	6 7 0

Company	Dividend 1939–40	Dividend 1940–41	Middle Price July 21	Rise or Fall	Yield £ s. d.
Public Boards					
Central Electricity:					
1950–70	5	5	110½	..	4 10 6
1955–75	5	5	115	..	4 7 0
1951–73	4½	4½	107½	..	4 3 7
1963–93	3½	3½	103½	..	3 7 8
1974–94	3½	3½	99½	..	3 5 4
London Elec. Trans. Ltd.	2½	2½	95½	..	2 12 4
London & Home Counties 1955–75	4½	4½	109	..	4 2 7
Lond. Pass. Trans.:					
A	4½	4½	112½	..	4 0 0
B	5	5	113½	+1	4 8 0
C	3	2⅞	44½	+3½	6 9 2
West Midlands J.E.A. 1948–68	5	5	110	..	4 11 0
Telegraph and Telephone					
Anglo-Am. Tel.:					
Pref.	6	6	110	..	5 9 1
Def.	1½	1½	25	..	6 0 0
Anglo-Portuguese	8	8	18/9	..	8 10 8
Cable & Wireless:					
5½ Pref.	5½	5½	103	+1	5 6 9
Ord.	4	4	60½	..	6 12 3
Canadian Marconi $1	Nil	4cts.	5/–	..	3 7 0
Globe Tel. & Tel.:					
Ord.	8½*	5*	27/6	..	3 12 9
Pref.	6	6	27/6	..	4 7 5
Great Northern Tel.:					
(£10)	Nil	Nil	15½	..	—
Inter. Tel. & Tel.	Nil	Nil	3	–¾	—
Marconi-Marine	7½	7½	28/9	..	5 4 4
Oriental Tel. Ord.	16	10	47/6	..	4 4 2
Telephone Props.	6	Nil	10/–	..	—
Tele. Rentals (5/–)	10	10	9/–	..	5 11 1
Traction and Transport					
Anglo Arg. Trans.:					
First Pref. (£5)	Nil	Nil	5/–	..	—
4% Inc.	Nil	Nil	10½	—	—
Brit. Elec. Traction:					
Def. Ord.	45	45	910	+10	4 18 0
Pref. Ord.	8	8	170	..	4 14 2
Bristol Trams	8	10	46/3	..	4 6 4
Brazil Traction	$1	50c	15½	+½	—
Calcutta Trams	8	5½	18/3xd	..	6 0 9
Cape Elec. Trams	5	5	20/–	..	5 0 0
Lancs Transport	10	10	43/9	..	4 11 4
Mexican Light:					
1st Bonds	5	5	87½	+2½	5 14 3
Rio 5% Bonds	5	5	100	..	5 0 0
Southern Rly.:					
5% Prefd.	5	5	65	+½	7 13 10
5% Pref.	5	5	107	+½	4 13 6
T. Tilling	10	10	47/6	..	4 4 3
Tilling & B.A.	7*	6½*	55/–	..	2 7 3
West Riding	10	10	39/6	..	5 1 3

(*Continued on next page*)

* Dividends are paid free of Income Tax.

Company	Dividend 1939–40	Dividend 1940–41	Middle Price July 21	Rise or Fall	Yield p.c. £ s. d.
Equipment and Manufacturing					
Aron Elec. Ord. ..	Nil	7½	25/– ..		6 0 0
Assoc. Elec.:					
Ord.	10	10	45/9 ..		4 7 6
Pref.	8	8	39/6 ..		4 1 0
Automatic Tel.&El.	12½	12½	51/3 ..		4 17 3
Babcock & Wilcox	11	11	42/–	–6d.	5 4 9
British Aluminium	10	10	43/3 ..		4 12 6
British Insul. Ord.	20	20	95/– ..		4 4 6
British Thermostat (5/–)	18½	18½	16/3 ..		5 13 10
British Vac. Cleaner (5/–)	12½	10	13/9 ..		3 12 9
Brush Ord. (5/–) ..	Nil	6	5/9 ..		5 4 3
Callender's ..	15	15	72/6 ..		4 2 9
Chloride Elec.Storage	15	15	72/6 ..		4 2 9
Cole, E. K. (5/–) ..	Nil	7	12/6 ..		2 16 0
Consolidated Signal	17	17	72/6 ..		4 3 8
Crabtree (10/–) ..	17½	17½	30/– ..		5 16 8
Crompton Parkinson Ord. (5/–) ..	30	20	21/3 ..		4 14 0
E.M.I. (10/–) ..	Nil	6	16/3 ..		3 14 10
Electric Construction	10	10	34/6 ..		5 16 0
Enfield Cable Ord.	12½	12½	53/9 ..		4 13 0
Elecl. Switchgear (10/–)	10	10	20/– ..		5 0 0
English Electric ..	10	10	41/3 ..		4 17 0
Ensign Lamps (5/–)	25	25	16/3 ..		7 13 10
Ericsson Tel.(5/–)	22*	20*	41/3 ..		2 8 6
Ever Ready (5/–)	40	40	32/– ..		6 5 0
Falk Stadelmann	7	7½	23/9	+1/9	6 6 4
Ferranti Pref. ..	7	7	27/6 ..		5 1 10
G.E.C.:					
Pref.	6½	6½	32/6 ..		4 0 0
Ord.	20	17½	81/3 ..		4 6 1
Greenwood & Batley	15	15	30/– ..		10 0 0
Hall Telephone(10/–)	10	12½	20/– ..		6 5 0
Henley's (5/–) ..	20	20	22/6 ..		4 9 1
4½% Pref. ..	4½	4½	22/6 ..		4 0 0
Hopkinsons ..	15	15	49/– ..		6 2 5
India Rubber Pref.	5½	5½	18/9 ..		5 17 6
Intl. Combustion ..	32½	30	105/– ..		5 14 3
Johnson & Phillips	15	15	60/– ..		5 0 0
Lancashire Dynamo	20	20	68/9 ..		5 16 4
Laurence, Scott (5/–)	15	12½	9/6 ..		6 11 7
London Elec. Wire	7½	7½	28/3 ..		5 6 2
Lucas, J.	15	15	66/3 ..		4 10 8
Mather & Platt ..	10	10	40/– ..		5 0 0
Met.Elec.Cable Pref.	5½	5½	21/3 ..		5 3 6
Murex	20	20	93/9	+1/6	4 5 7
Pye Deferred (5/–)	25	25	16/–	–3d.	7 16 3
Revo (10/–) ..	20	17½	28/9xd	+3/4	6 1 9
Reyrolle	12½	12½	58/9 ..		4 5 0
Siemens Ord. ..	7½	7½	26/3 ..		5 14 3
Smith, S. (1/–) ..	50	37½	7/– ..		5 7 2
Strand Elec. (5/–)	2	4	4/6 ..		4 9 0
Switchgear & Cowand (5/–) ..	15	10	10/– ..		5 0 0
T.C.C. (10/–) ..	Nil	5	15/– ..		3 6 8
T.C. & M... ..	10	10	43/9xd	+6d.	4 11 4
Telephone Mfg.(5/–)	9	9	9/– ..		5 0 0
Thorn Elec. (5/–)	20	20	13/9 ..		7 5 6
Tube Investments	23¾	20	84/6 ..		4 14 3
Vactric (5/–) ..	Nil	Nil	6/– ..		—
Vickers (10/–) ..	10	10	16/3 ..		6 3 0
Ward & Goldstone (5/–)	20	20	18/6 ..		5 8 3
Westinghouse Brake	10	10	47/6 ..		4 4 2
Walsall Conduits(4/–)	55	55	36/3 ..		6 4 6
West, Allen (5/–)..	7½	7½	5/9 ..		6 10 5

* Dividends are paid free of Income Tax.

Stocks & Shares (*Continued from page* 130) months, this comparing with 6 per cent. in the previous year, both free of tax. For the year ended May, 1941—that is, the previous twelvemonth—and in the three preceding years, the company paid an additional cash bonus out of a special reserve. This reserve has apparently come to an end, and the dividend of 5 per cent. net just declared, may be reasonably regarded as the standard rate, unless, of course, it should become possible for the Trust to restore the dividend to 6 per cent. At 5 per cent. the shares at 28s. give a net return of £3 11s. 6d. per cent. on the money, equal to £7 3s. per cent. taking tax at 10s. in the £, a yield which, in view of the security of the investment, may be considered very fair under current conditions.

The special reserve, it is interesting to recall, represented the 4 per cent. funded income stock received from Cable & Wireless (Holding), Ltd., in lieu of dividend arrears.

Large Lines

These are days, Stock Exchange brokers find, when it is oftener more easy to deal in a fair line of shares than in some smaller number. This indicates that the prospective purchasers are, more often than not, trust companies, financial institutions and the like, to whom an offer makes little appeal when it is in 500 shares of a company, though such investors would welcome the company on their books if, say, 5,000 shares were obtainable.

Buyers in this class will find at the moment unusual scope for their predilections in, for instance, 5,000 County of London Electric ordinary shares offered at 37s. and 5,000 Edmundsons at 27s. 9d., both yielding £4 6s. 6d. per cent. Five thousand Lancashire Electric Light ordinary obtainable at 34s. pay £4 8s. 3d.; a similar number of Midland Counties at 39s. and Southern Areas at 20s. 6d. would return £4 2s. and £4 17s. 6d. per cent. respectively. These yields are calculated, at the prices mentioned, upon the dividends declared by the companies for the last completed year in each case. It seems hardly necessary to add that dividends on ordinary shares are liable to variation from year to year.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1940

1053. "Telegraph receiving and recording systems." A. Abbey (Bolinder's Fabriks Aktiebolag). January 17th, 1940. (Convention date not granted.) (546112.)

9204. "Method of introducing barium into a closed space." Mullard Radio Valve Co., Ltd. (Naamlooze Vennootschap Philips' Gloeilampenfabrieken). May 24th, 1940. (Convention date not granted.) (546048.)

10817. "Ratchet-operated step-by-step mechanism." Philco Radio & Television Corporation. July 25th, 1939. (545992.)

10818. "Tuning controls for radio receivers." Philco Radio & Television Corporation. July 25th, 1939. (545993.)

15297. "Electrical sound reproduction." Radio Corporation of America. October 31st, 1939. (546077.)

16622. "Electrically driven hand tools." H. A. Whiteside. November 18th, 1940. (546117.)

16697. "Blind landing systems using electromagnetic waves." Standard Telephones & Cables, Ltd., and H. P. Williams. November 20th, 1940. (546021.)

16870. "Holders for carbons or electrodes for electric arc lamps or other electric appliances." G. D. Mitchell. November 25th, 1940. (546119.)

17821/2. "Electric generators." A. Reyrolle & Co., Ltd., and J. W. Bayles. December 18th, 1940. (546083/4.)

17892. "Electric resistance heating units." Westinghouse Electric International Co. December 29th, 1939. (546024.)

17946. "Electrical measuring apparatus." Standard Telephones & Cables, Ltd., R. N. Barnard and W. Kram. December 20th, 1940. (545999.)

17949. "Electrical power supply arrangements." Standard Telephones & Cables, Ltd. and B. B. Jacobsen. December 20th, 1940. (546028.)

17950. "Circuit arrangements for thermionic oscillation generators, particularly for radio communication systems." Standard Telephones & Cables, Ltd., J. D. Holland and D. D. Robinson. December 20th, 1940. (546029.)

18136. "Snap-action electric switches." Brookhirst Switchgear, Ltd., and A. R. H. Thorne. December 25th, 1940. (546135.)

1941

2. "Mounting for electric motors for driving sewing machines." W. C. Fairweather (Singer Manufacturing Co.). January 1st, 1941. (546002.)

60. "Automatic electric arc welding." F. W. B. Kittel (Linde Air Products Co.). January 2nd, 1941. (546124.)

582. "Motion transmitting couplings." English Electric Co., Ltd., and G. Dickinson. January 15th, 1941. (546128.)

1913. "Furnace hearths." Birmingham Electric Furnaces, Ltd., and F. Kerfoot. February 12th, 1941. (546131.)

1981. "Television receiving systems." Farnsworth Television & Radio Corporation. October 29th, 1940. (546094.)

1998. "Generation of frequency-modulated electrical oscillations." A. C. Cossor, Ltd., and D. A. Bell. February 13th, 1941. (Cognate application, 15519/41.) (546132.)

2197. "Apparatus for measuring the quality and quantity of X-radiation." R. H. Herz. February 17th, 1941. (546095.)

2721. "Electric lampholders." Edison Swan Electric Co., Ltd., and F. M. Cocksedge. February 28th, 1941. (546040.)

3012. "Electric lampholders and the like." Belling & Co., Ltd., C. R. Belling and H. M. Hibberd. March 5th, 1941. (546041.)

3408. "Combined lighting and air conditioning systems." H. G. Campbell, G. D. Skinner and Benjamin Electric, Ltd. March 13th, 1941. (546005.)

4115. "Terminal blocks and contact blocks and like electric fittings and the mounting thereof." English Electric Co., Ltd., and A. M. Pooley. March 27th, 1941. (Cognate application 4098/42.) (546061.)

4138. "Intertube intermediate-frequency coupling systems for modulated carrier signal receivers." Hazeltine Corporation. April 18th, 1940. (546062.)

4237. "Electric fittings having spring contact clips." English Electric Co., Ltd., and C. A. Wilson. March 28th, 1941. (546063.)

4615. "Electric lighting fittings." British Thomson-Houston Co., Ltd., E. R. Edinborough and H. E. G. Watts. April 7th, 1941. (546064.)

6839. "Holders for lamps and other electrical devices." Carr Fastener Co., Ltd., and G. Wagstaff. May 28th, 1941. (546045.)

7822. "High-frequency tuned circuits." Marconi's Wireless Telegraph Co., Ltd. June 20th, 1940. (546069.)

10339. "Voltage regulators." British Thomson-Houston Co., Ltd. August 14th, 1940. (546072.)

11195. "Electric couplings." H. H. Goldstaub. September 2nd, 1941. (546073.)

1942

931. "Clamps for square section shafts or the like." Igranic Electric Co., Ltd., and S. R. Wright. January 22nd, 1942. (546108.)

2544. "Receivers for frequency or phase modulation." Marconi's Wireless Telegraph Co., Ltd. December 22nd, 1939. (Divided out of 544502.) (546011.)

6080. "Electric motor casings." W. C. Fairweather (Singer Manufacturing Co.). January 1st, 1941. (Divided out of 546002.) (546012.)

Peruvian Electrical Imports

During the last quarter of 1941 the value of electrical apparatus imports into Peru was 3,927,000 soles (£1 = 26 soles approx.) as compared with 2,382,000 soles in the corresponding period of 1940.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Aberdeen.—July 29th. Corporation. Articles, including electrical fittings, for three months, commencing August 1st. Specifications, etc., from the city engineer.

Australia. — TOWNSVILLE, QUEENSLAND. — August 20th. Town Council. 3,000-kW turbo-alternator. Specification (No. 119) from the town clerk.—*Tenders.*

SYDNEY.—August 31st. Dubbo Lighting Co. Internal combustion engine driven alternator set. Specifications from the company's offices. Martin Place.—*Tenders.*

Eire.—GALWAY.—July 31st. County Galway Board of Health. Central heating and electrical installations in connection with improvements and new pavilions at Woodlands Sanatorium. Plans and specifications from N. Mathews, consulting engineer, 104, Grafton Street, Dublin. Tenders to Secretary, Central Hospital, Galway.

Orders Placed

Cardiff.—Electricity Committee. Accepted. Laboratory equipment (£497).—A. Gallenkamp & Co., Ltd.

Essex.—COUNTY HEALTH COMMITTEE. Accepted. Provision of tubular heating in cubicles at Broomfield hospital (£228).—County of London Electric Supply Co.

Middlesbrough.—Corporation. Accepted. Receivers in connection with a wireless service for the police force (£62).—Marconi's Wireless Telegraph Co.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Birmingham.—Additions, Moseley Hospital (£2,550); city engineer.

Bootle.—Slipper baths, Marsh Lane (£2,958), and shelters (£5,883); borough engineer.

Bredbury.—New church, Bredbury Hall estate, for Chester Diocesan Board; Rev. E. D. Reeman, The Vicarage, Bredbury, Stockport.

Bromsgrove.—Factory, Stoke, near Bromsgrove; L. G. Harris & Co., brush makers, Hanbury Road, Stoke, near Bromsgrove.

Dewsbury.—Canteen, Architects' Department, Miners' Welfare Commission, Ashley House, Ashstead, Surrey.

Edgware.—Workshop, heating chamber, etc.; Boosey & Hawkes, Ltd.

Ennerdale (Cumberland).—British Restaurant; R.D.C. surveyor.

Essex.—Rest centres (£3,000); youth centre, Fairycroft, Saffron Walden (£1,518) and Wanstead, hostel, Wanstead (£1,000); county architect, Chelmsford.

Gateshead.—School kitchen at Pipewellgate (£1,400); A. V. Clerey & Son, builders, Sunderland.

School canteens, J. Sutton & Son, builders, Gateshead.

Hereford.—Sawmill and office, Newtown Road; L. Miller, timber merchant, Chase Street, Red Bank, Manchester, 4.

Extensions, canning factory; J. E. Goodwin, Ltd., Huntington.

Hulme.—Motor works; H. S. Fairhurst & Son, Chancery Chambers, 55, Brown Street, Manchester, 2.

Jarrow-on-Tyne.—Three public shelters each for 150 people; J. S. Weir, borough engineer, Town Hall.

Air-raid shelter for the St. John Malting Co., Grant Street; J. Barrow, Northbourne Road.

Levenshulme.—Extensions to dairy for Dobson's Dairies, Ltd.; F. Hill, consulting engineer, 11, Tenterden Street, Bury, Lancs.

London.—CAMBERWELL.—Five nurseries; borough engineer.

Longport (Staffs).—Works extensions; Billington & Newton, Ltd.

Manchester.—Canteen, Royd Mill; Lancashire Cotton Corporation, Ltd., Blackfriars House, Manchester, 3.

Mansfield.—Paint spraying works, Sherwood Village Settlement, for Nottinghamshire C.C.; E. W. Roberts, county architect, County Offices, Nottingham.

Additions, sawmill, Chesterfield Road; W. J. Hutchinson & Son, builders, Bulwell Lane, Basford.

Feeding centre, Clumber Street; borough engineer.

Marley Hill (Durham).—Canteen at colliery; L. J. Couves & Partners, 2, Westfield Avenue, Gosforth, Newcastle.

Newcastle-on-Tyne.—Three film stores and winding room; J. Walton Taylor, Norwich Union Buildings.

Stockton-on-Tees.—Workshop for Pickerings, Ltd., Back Major Street.

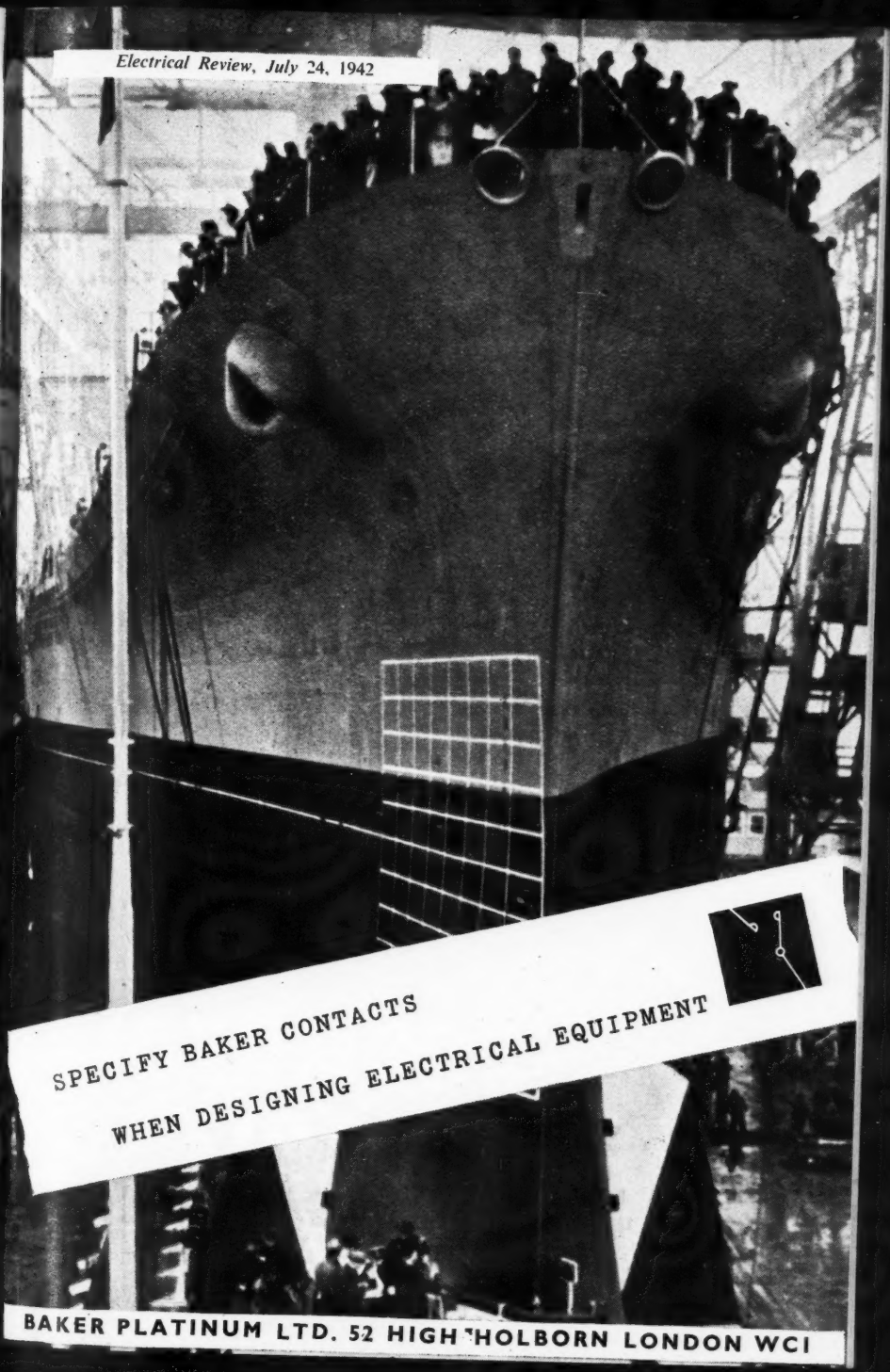
Sunderland.—Canteen, South Docks Engineering Works; W. Pearson & Son, Stranton, West Hartlepool.

Repairing damage (£20,000) caused by fire at Hendon Paper Works; P. W. Davidson, managing director.

Swansea.—Three restaurants; borough architect.

Watergate (Durham).—Miners' canteen; Hetherington & Wilson, County Chambers, Newcastle-on-Tyne.

Watford.—Research centre and library, Church Road; Printing & Allied Trades Research Association.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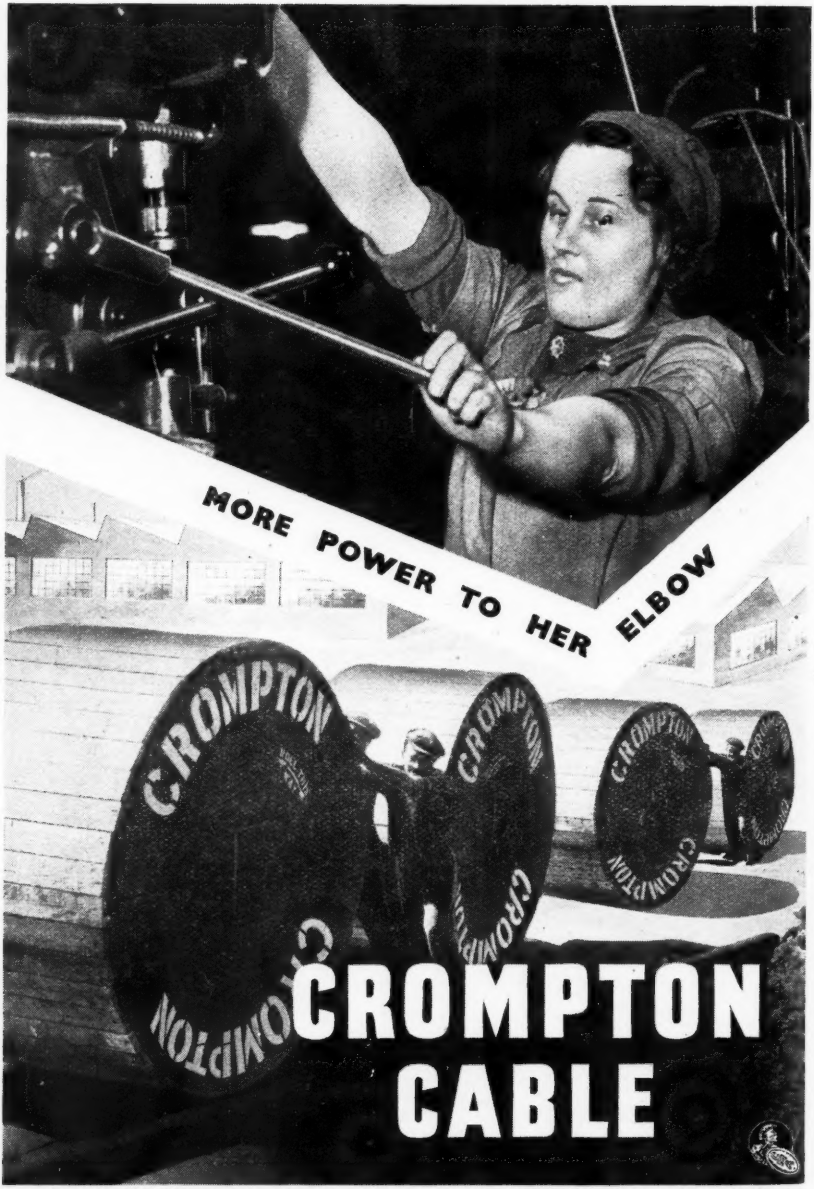

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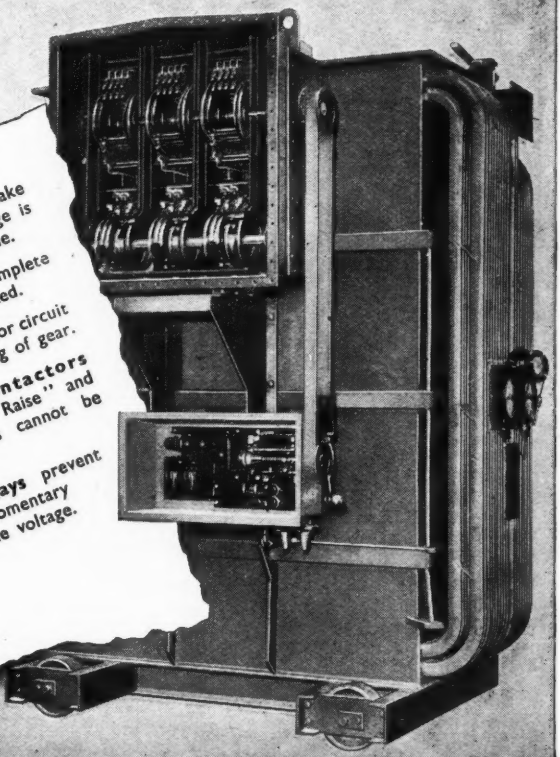

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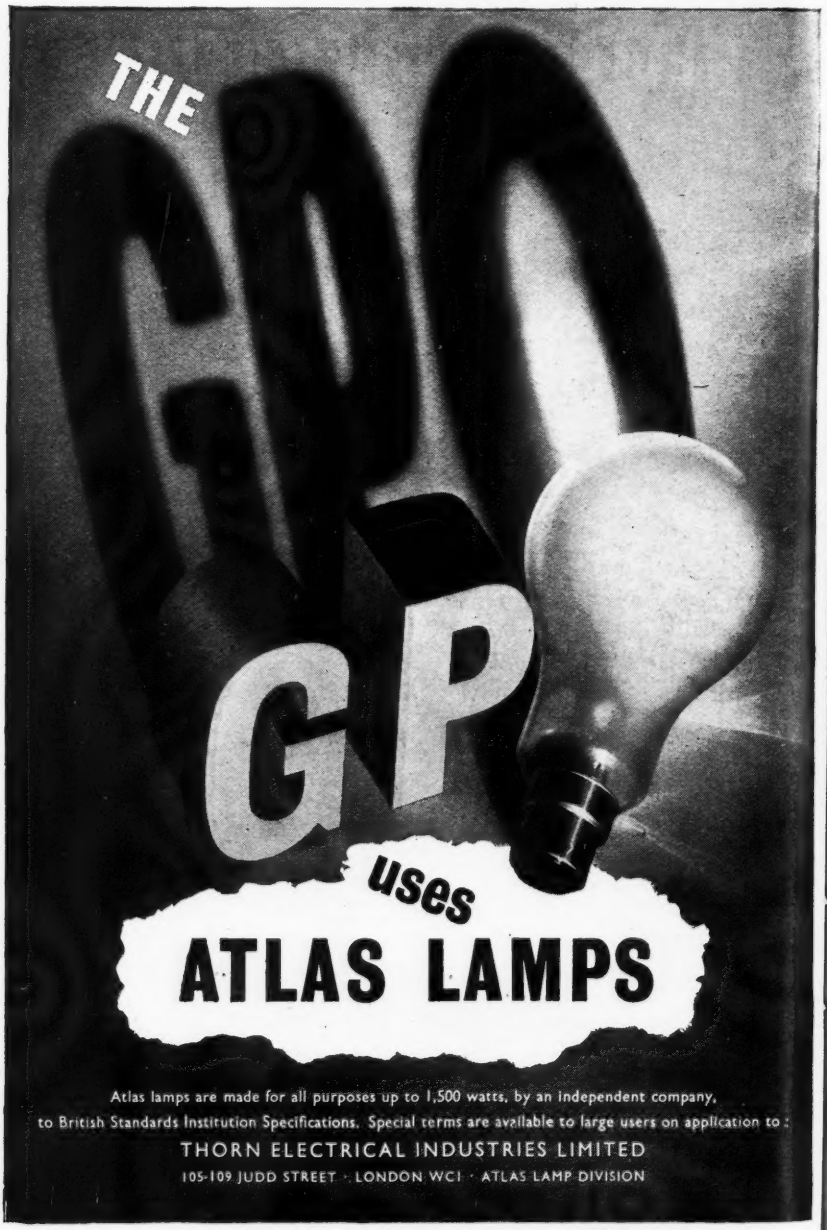
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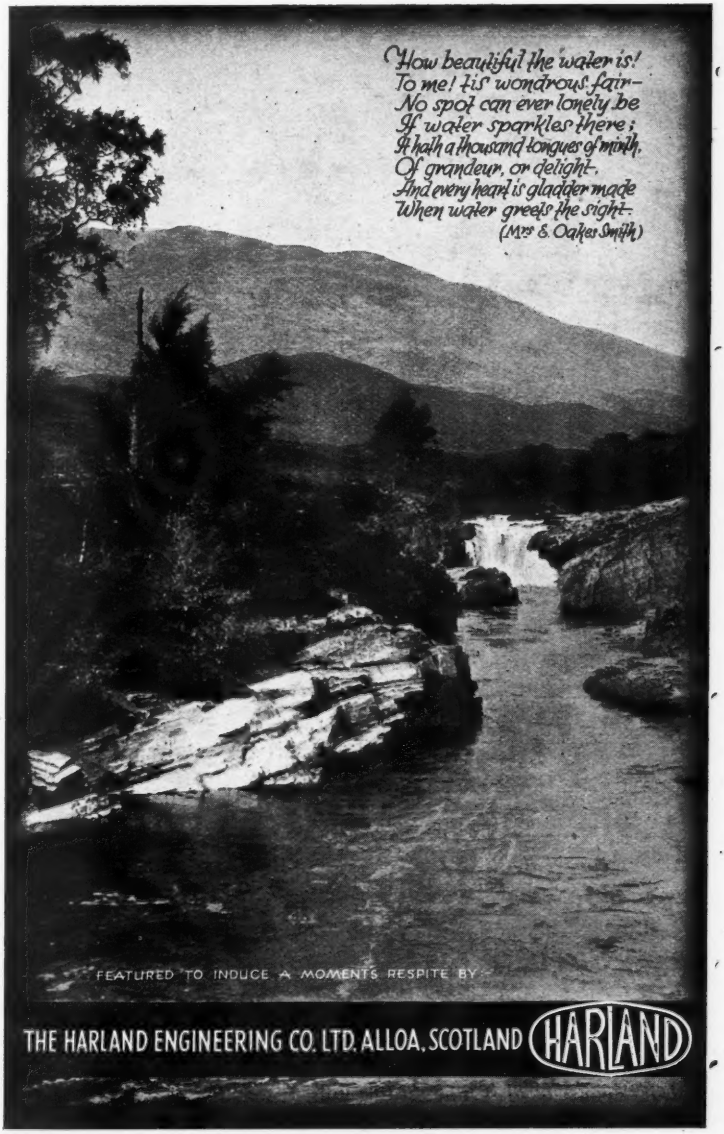
How beautiful the water is!
To me! Its wondrous fair—
No spot can ever lonely be
If water sparkles there;
It hath a thousand tongues of mirth,
Of grandeur, or delight,
And every heart is gladder made
When water greets the sight.
(Mrs S. Oakes Smith)
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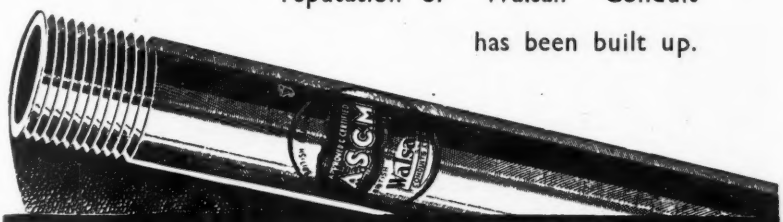

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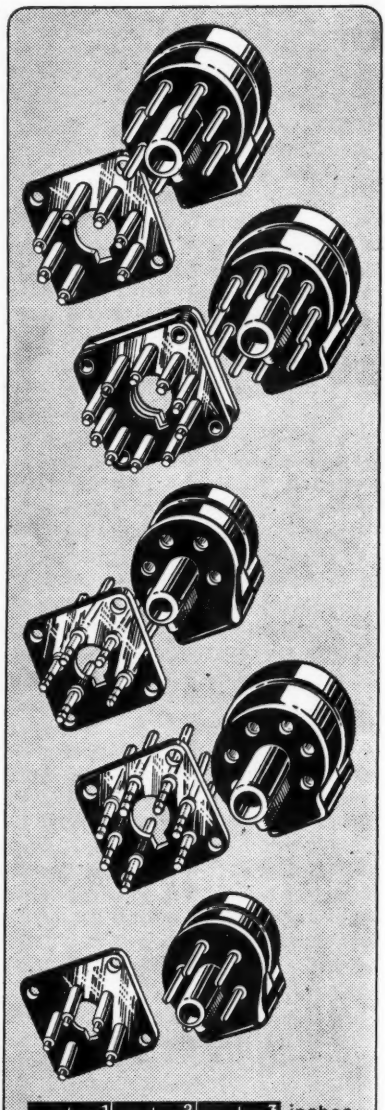

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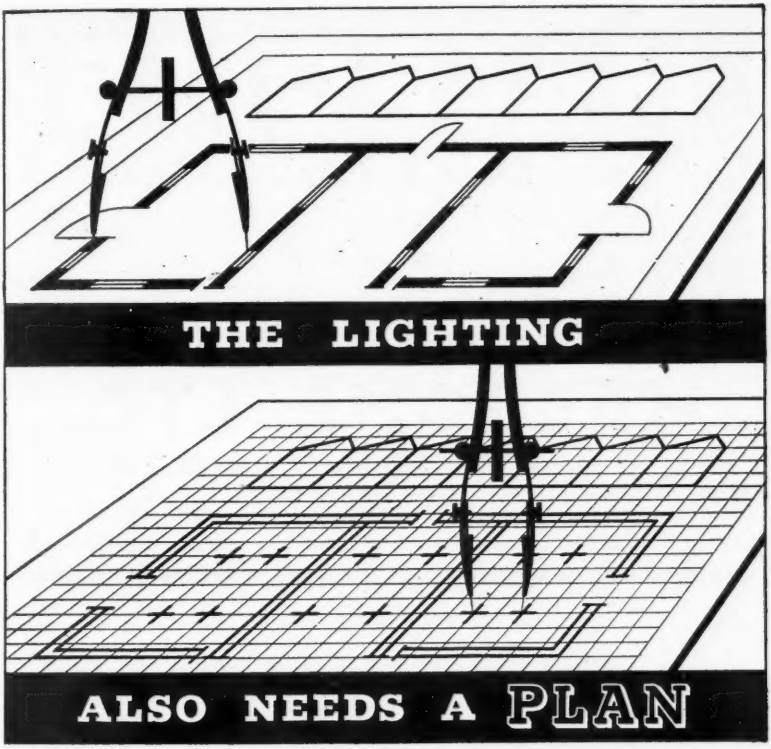

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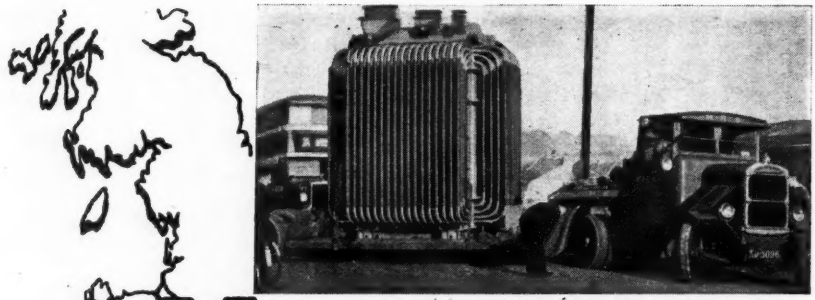

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ELECTRIC TRANSFORMER Co LTD

SERVES THE COUNTRY with
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EMPIRE WORKS Phone 1691-2 DEWSBURY

DAVENSET DRIMET
BATTERY CHARGERS

Incorporating Selenium Metal Rectification, these chargers are available for a very wide range of outputs.

Quotations for rectifiers constructed to meet individual requirements will be sent on receipt of details.

The illustration shows the Model D.S.C.1. which is capable of charging from one to ten 6-volt batteries at up to 8 amperes.

Details of this and many other standard models are contained in our catalogue D.E.R.1, available on request.

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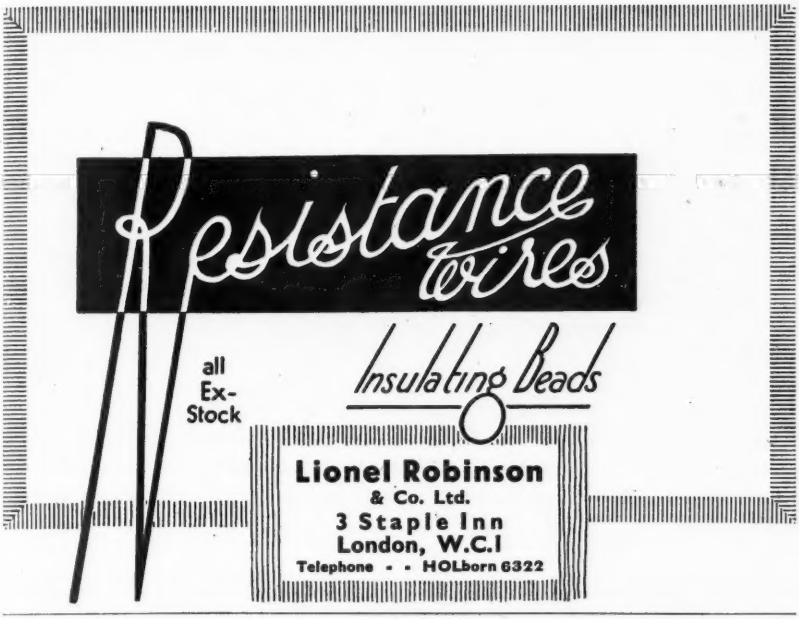

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MICA & MICANITE INSULATION

TUBES: Round, square or rectangular, in Mica or Bakelite.
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HEATER MICANITE for domestic and other Electrical Appliances.
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The Makers of "*Tank*" *Brand* Non-Ferrous Metal Alloys, including :— Extruded Brass and Bronze Rods and Sections, Brass and Bronze Stampings, Gun Metal and Phosphor Bronze Ingots, Chill Cast Gunmetal and Phosphor Bronze Bars and Terne Metal and Cupro Nickel Ingots and Granules, regret their inability to satisfy all the requirements of clients for their products for the time being.

However, the complete satisfaction of clients, old and new, is their chief concern, and when Peace returns to the World again, they will strive to satisfy all, and prove to new friends that their products are second to none. They are grateful for the understanding and forbearance already shown to them in these difficult times.

MINERVA

Insulating Varnishes and Compounds

Specialist Manufacturers of Electrical and Industrial Finishes. Particulars on request.

The importance of electrical machinery and apparatus, in time of war, cannot be too highly stressed. Efficient operation of the vital components of Ships, Aeroplanes, Industrial Apparatus, etc., is essential. It is imperative, also, that the best electrical machinery be used as the motive power for machine tools employed in the manufacture of munitions. All risks of breakdown must be eliminated, and the selection of the most reliable insulation therefore becomes a matter of great importance. The perfect electrical machine *must* be perfectly insulated ! Pinchin, Johnson & Co. Ltd. supply Insulating Varnishes and Compounds to the principal Electrical Manufacturing Companies, Railways, Tramways, Lighting and Power Stations. May we help you?

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TRANSFORMERS

AIR-COOLED
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Special units designed and built for any application

Also
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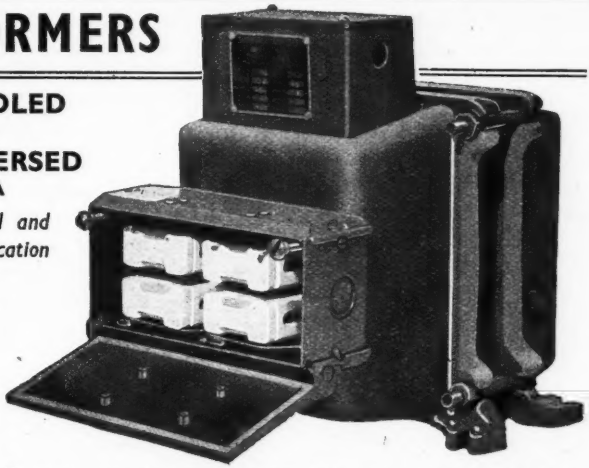

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Igranic Type "M" Brakes are for D.C. Service and embody a direct action mechanism eliminating all toggles.

Outstanding features :

Short Shoe Stroke
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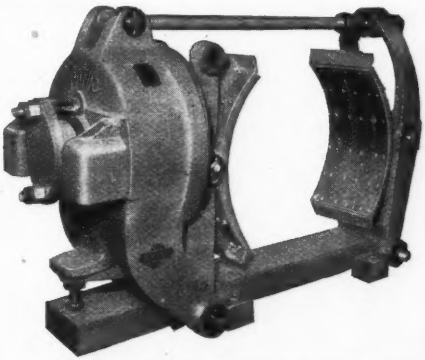
Other Igranic Magnetic devices include :—
Lifting magnets, Separators, Clutches, Solenoids, etc.



IGRANIC ELECTRIC CO. LTD.
LONDON • BEDFORD

Write for Leaflets giving details of our Magnetic specialities

Queen Victoria had just become Empress of India when **SIEMENS** became established at Millbank and during the years of peace that followed when the commercial might of England grew, no greater name than **SIEMENS** for first-class quality equipment became known in Electrical Engineering Circles.

The Company's products such as Cables, Telephones, Batteries, Electric Lamps, and Supplies for the Electrical Distributing Trade have become world renowned.

To-day the services of the Company are fully occupied.

Our friends will fully understand our present position and can rest assured that when normal trade conditions are again possible our products, with their high reputation, will be made fully available to them.

SIEMENS

MANUFACTURING ELECTRICAL ENGINEERS

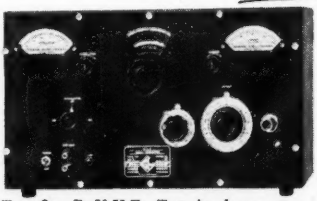
Advt. of SIEMENS ELECTRIC LAMPS AND SUPPLIES LIMITED, 38/39 Upper Thames Street, London, E.C.4, and Branches.

Blind Man's Buff !

There have been many occasions in the past when researchists, works engineers and their colleagues have hardly known "which way to turn" for the equipment they have so urgently required. In publishing their much appreciated details and specifications of new equipment, Claude Lyons Ltd. has many times provided the clue. But now we have to remember that people other than our friends might welcome these specifications.

So for the future let it be sufficient to say that we are very much in touch with developments on both sides of the Atlantic—that we are still, from time to time, introducing new items of equipment of the highest precision and quality—and that representing as we do many of the foremost specialist manufacturing organisations we expect to continue to meet these needs . . . and sometimes, perhaps to "steal a march" by introducing some items almost before you were aware of needing them !

Claude Lyons



Type 804-B U.H.F Test-signal generator. Range 7.5–330 Mc/sec.

Claude Lyons LTD

ELECTRICAL AND RADIO LABORATORY APPARATUS ETC.

180 Tottenham Court Road, London, W.1

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Goltone
High-grade accessories include complete range of holders, plug connectors and ceiling roses to B.S.S. specifications.
Deliveries of most lines if accompanied by Priority evidence receives prompt attention.
Catalogue BH/1039 on request.
Ward & Goldstone
PENDLETON MANCHESTER Ltd.
ESTABLISHED 1892

FIRE cannot harm PYROTENAX Cable

1. *After bending at right angles, and flattening in a vice, successfully withstood consecutive pressure tests of 4 kV without breakdown.*
2. *After flattening to less than ¼" thickness insulation still preserved between conductors and conductors and sheath.*
3. *Flattened and doubled without diminution of electrical properties.*

FOR reasons of safety and reliability, and the ease with which it can be installed, Pyrotenax Mineral Insulated Cable is being specified for an increasing number of Power Station and Sub-station installations for the leading Supply Companies, and Industrial Organisations in Great Britain and the British Empire.

In addition to its complete fireproof properties it is also unaffected by oil, industrial atmospheres and condensation.

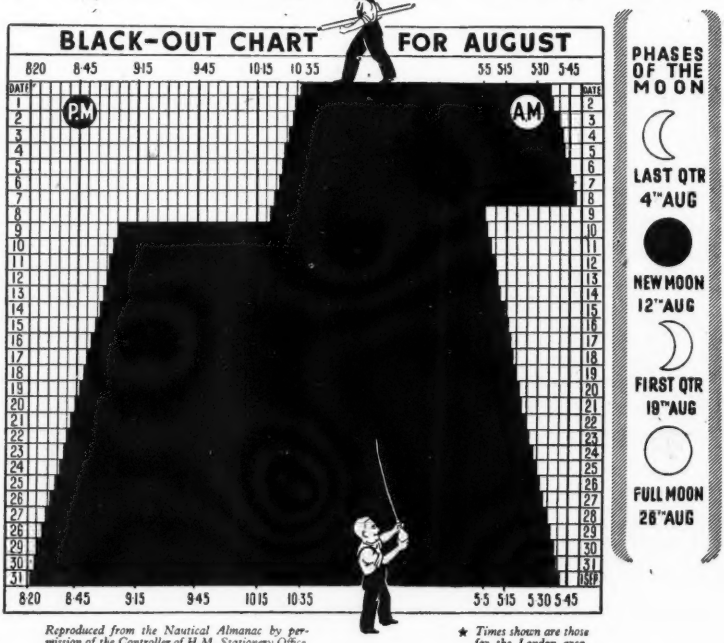
PYROTENAX

WITHSTANDS FIRE AND INJURY

PYROTENAX LTD., HEBBURN-ON-TYNE

London Office : 7 Victoria Street, London, S.W.1

Let the change remind you . . .



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★ *Times shown are those for the London area.*

In August, the extra hour of daylight is lost to the industrial war effort, and besides, black-out hours increase alarmingly with the shortening days. Preparations are being made for winter—lighting schemes adjusted to assist a still greater output, and Osram will continue to be the choice of all who demand of their lamps really dependable service under all conditions.

Osram

A G.E.C. PRODUCT

THE WONDERFUL LAMP

NATIONAL EMERGENCY. *Please assist by saving all packing material for collection when our van calls*

CLASSIFIED ADVERTISEMENTS

ADVERTISEMENTS for insertion in the following Friday's issue are accepted up to **First post on Monday**, at Dorset House, Stamford Street, London, S.E.1.

THE CHARGE for advertisements in this section is 2/- per line (approx. 8 words) per insertion, minimum 2 lines 4/-, or for display advertisements 30/- per inch, with a minimum of one inch. Where the advertisement includes a Box Number there is an additional charge of 6d. for postage of replies.

SITUATIONS WANTED.—Three insertions under this heading can be obtained for the price of two if ordered and prepaid with the first insertion.

REPLIES TO advertisements published under a Box Number if not to be delivered to any particular firm or individual should be accompanied by instructions to this effect, addressed to the Manager of the ELECTRICAL REVIEW. Letters of applicants in such cases cannot be returned to them. The name of an advertiser using a Box Number will not be disclosed. All replies to Box Numbers should be addressed to the Box Number in the advertisement, c/o ELECTRICAL REVIEW, Dorset House, Stamford Street, London, S.E.1. Cheques and Postal Orders should be made payable to ELECTRICAL REVIEW LTD. and crossed.

Original testimonials should not be sent with applications for employment.

SITUATIONS VACANT

BOROUGH OF CREWE

Electricity Department

Appointment of Accountancy and Statistical Officer

APPLICATIONS for the above appointment are invited from persons having a good experience of the commercial work of an Electricity Supply Undertaking, including the supervision of clerical and mechanised accountancy work, for which membership of an appropriate professional association will be a recommendation.

The salary will be the maximum of the present Council scale, £366 6s. per annum, including war bonus (at present £33 16s.). A Whitley Council grading scheme is at present under consideration by the Council.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the selected candidate will be required to pass a medical examination.

Applications, stating age, education, qualifications and experience, together with copies of testimonials, should reach the Borough Electrical Engineer, Electricity Street, Crewe, not later than Saturday, August 1st, 1942.

K. B. EDWARDS,
Town Clerk.

Municipal Buildings,
Crewe.
17th July, 1942. 2307

CLERICAL Assistant required in stores office. Must have a good knowledge of electrical material as handled by wholesalers. Apply—London Electrical Company, 92, Blackfriars Road, S.E.1. 33

COMPETENT Electrical Engineer, with thorough knowledge of design of motors, generators, transformers, required temporarily for about 4 weeks in London area. Part-time arrangement considered, permanent employment quite possible eventually.—Box 2303, c/o The Electrical Review.

ELECTRIC Lamps. Experienced Representatives required to call on the trade and large consumers in all districts. Very good terms offered. Write full particulars of past experience and territory covered to—Box 2264, c/o The Electrical Review.

SUPERVISING Works Manager required by electrical manufacturing firm on work of national importance in West Country. State salary and particulars of experience.—Box 2292, c/o The Electrical Review.

WANTED, men over military age and women over 31 for technical and supervision duties in electric lamp works in North London. Write, stating qualifications, to —Box 2259, c/o The Electrical Review.

APPOINTMENTS FILLED

Dissatisfaction having been so often expressed that unsuccessful applicants are left in ignorance of the fact that the position applied for has been filled, may we suggest that Advertisers notify us to that effect when they have arrived at a decision. We will then insert a notice free of charge under this heading.

SITUATIONS WANTED

ELECTRICIAN, 30 years' experience, age 46, able to carry out contracts in all systems, can take full charge, pre-war employer of 30 electricians and mates, now desires post estimating, buying, running of contracts or charge of installation.—Box 8019, c/o The Electrical Review.

ENGINEER, 33, sound theoretical and practical training, requires position as works manager or production engineer. L.T. switchgear, starters, plastics, planning, estimating, design, tooling and administration. Travel anywhere.—Box 8017, c/o The Electrical Review.

EXPERIENCED Salesman, long standing and valuable contacts electrical and industrial undertakings and the trade, desires post as representative and prospects of organising work with established electrical equipment manufacturers engaged in utility war production. Not liable for military service.—Box 7993, c/o The Electrical Review.

PROFESSIONAL Electrical Engineer seeks executive position, capable of organising and controlling large staff. Highest qualifications and credentials.—Box 7997, c/o The Electrical Review.

SUPERVISING Electrical Engineer, wide experience extra high tension equipment and protection, desires responsible post.—Box 8015, c/o The Electrical Review.

TECHNICAL Representative with long connection well-known electrical manufacturers, works experience, over military age, requires appointment, London area.—Box 8016, c/o The Electrical Review.

TECHNICAL Sales Engineer (38), A.I.E.E. & Central Register, shortly free to negotiate new appointment. General L.T. distribution and specialist in lighting and heating planning. 15 years' association with supply undertakings, consultants, electrical contractors; aircraft, armament and engineering works—Birmingham, Coventry, East Midlands and adjacent areas. Own car. Replies in confidence to—Box 7974, c/o The Electrical Review.

YOUNG Electrical Engineer, B.Sc., good all-round experience, desires responsible position.—Box 8000, c/o The Electrical Review.

FOR SALE

GEORGE COHEN, SONS & CO., LTD.

SUPPLIERS OF SECONDHAND GUARANTEED ELECTRICAL PLANT.

SHOWROOMS AT: WOOD LANE, LONDON, W.12.

Telephone: Shepherds Bush 2070.

STANNINGLEY, NEAR LEEDS.

Telephone: Pudsey 2241.

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CARLTON ELECTRIC LAMPS

HIGHEST QUALITY—FULLY GUARANTEED

LARGE STOCKS ALWAYS AVAILABLE FOR IMMEDIATE DELIVERY. ALL STANDARD VOLTAGES AND WATTAGES FROM 15 WATT UPWARDS AT COMPETITIVE PRICES.

AGENTS AND REPRESENTATIVES REQUIRED IN ALL DISTRICTS.

CARLTON ELECTRICAL APPLIANCES, LTD.,

199, WARDOUR STREET, LONDON, W.1.

Phone: Gerrard 3929.

2263

PLANT FOR SALE

OFFERS are invited for the generating and other plant of the Symondsbury Electric Light Co., Ltd. (in liquidation). The plant consists of the following:—

9-h.p. Lister Diesel Engine, 1,000 r.p.m., radiator-cooled, direct-coupled to Lister Generator, 110 volts, 41 amps., with fully automatic switchboard with usual voltmeter and ammeter.

54-cell Premier Battery, 5-plate, No. H.F.2, 180 amp. hours (15 cells have been fitted with new positive plates less than 2 years ago).

Also 1921 Generating Set, comprising Austin 7-h.p., 4-cylinder engine, 1,100 r.p.m., direct-coupled to English Electric 3.1-kW generator and fully automatic switchboard.

2 Galvanised Enclosed Fuel Tanks, 300 and 180 gallons.

A quantity of Overhead Cable, 7/.064, bare and insulated. 18 1s. in the slot Meters by Siemens, 3 and 5 amps., 100 volts. 9 quarterly Meters by Ferranti, 2½ to 20 amps., 100 volts. A quantity of secondhand Bulbs, 100 to 110 volts.

Can be inspected by appointment at any reasonable time. Inquiries to be addressed to—Sir Philip Colfox, Symondsbury Manor, Bridport, Dorset. 2294

MOTOR GENERATOR SETS

BUILT to customers' requirements of available new and used plant, many in stock at Wembley—inspection invited. Please send us your enquiries—*we can help you to save time.*

OVER A THOUSAND MACHINES ALWAYS IN STOCK.

DYNAMO & MOTOR REPAIRS, LTD.,
Wembley Park, Middlesex.

Telephone: Wembley 3121 (4 lines).

Also at Rolfe Street, Smethwick, Staffs.

Telephone: Smethwick 0047.

26

400-VOLTS, 3-PHASE, 50-CYCLES FERGUSON & PAILIN SHEET STEEL SWITCH CUBICLES

2,000 amp. to 300-amp. sizes, also B.B. Coupler and Lighting Cubicles. AS NEW.

ALSO

SWITCHBOARD, 400/3/50, to control one 300- and two 225-kVA Alternators. AS NEW.

ALSO

200 yds. GOOD SECONDHAND RE-USABLE CABLE, 3-core, .3 P.I.L.C., D.W.A. on Drum, and many short lengths of other sizes.

MIDLAND COUNTIES ELECTRICAL ENGINEERING CO., LTD.,
GRICE STREET, WEST BROMWICH.

44

MOTOR GENERATOR SETS FOR DISPOSAL

For 500/550 volt D.C. Incoming Supply

METRO-Vick Motor Generator Set, 86 H.P., shunt interpolar motor, driving 56-kW, 90-volt compound interpolar Generator. Unused set, date 1935.

L. D. & M. Motor Generator Set, 91-H.P., 850-r.p.m. motor, driving 61-kW, 105-volt Generator. Date 1928. In perfect condition with ball and roller bearings throughout.

Crompton Motor Generator Set, 60-H.P. motor, driving 40-kW, 220-volt Generator.

Starting gear and switchboards available.

NEWMAN INDUSTRIES LIMITED,
YATE, BRISTOL. 2309

WATER TUBE BOILERS IN STOCK

One	35,000	lbs. evaporation,	205	lbs.	W.P.
Two	25,000	,, ,,	250	,,	,,
Two	12,000	,, ,,	200	,,	,,
One	12,000	,, ,,	160	,,	,,
One	5,000	,, ,,	100	,,	,,
One	4,000	,, ,,	160	,,	,,

We instal complete, including brickwork. Economisers, Pumps, Piping Valves, Generating Sets and Motors in stock. Please send us your enquiries; we can give immediate delivery.

BURFORD, TAYLOR & CO., LTD.,
Boiler Specialists, Middlesbrough.
Telephone, Middlesbrough 2622.

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ELECTRIC MOTORS & DYNAMOS

WE hold one of the largest stocks of New and Second-hand Motors. Secondhand machines are thoroughly overhauled. Inspection and tests can be made at our Works.

For Sale or Hire. Send your enquiries to:—

BRITANNIA MANUFACTURING CO., LTD.,
22-23 BRITANNIA STREET,
CITY ROAD, LONDON, N.1.

Telephone: 5512-3 Clerkenwell. 13

IMMEDIATE DELIVERY POSSIBLE OF

2 Belliss & Morcom-Laurence Scott Generators, 780 amps., 205 volts D.C., steam 160 lbs. pressure.
1 Open-type D.C. Switchboard for above.

17 205-v. D.C. Motors, slow speed, from 85 H.P. to 2 H.P., complete with starters and control gear, slide rails, etc.

Quantity Shafting, Pulleys and Belting.

All in running order, only recently shut down. Fullest details available by application to (acting for owners) E. G. Phillips, Consulting Engineer, Arakus House, Anneesley Grove, Nottingham. 2287

A.C. and D.C. House Service Meters, all sizes, quarterly and prepayment, reconditioned, guaranteed one year. Repairs and recalibrations.—The Victa Electrical Co., 47, Battersea High Street, S.W.11. Tel. Battersea 0780. 10

A.C. and D.C. Motors, all sizes, large stocks, fully guaranteed.—Milo Engineering Works, Milo Road, East Dulwich, S.E.22 (Forest Hill 4422). 7833

AERIAL Cables, all sizes quoted for; good deliveries against Government contract numbers.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 8020

ALTERNATING Sets for frequency conversion, 440-3-50 to 120-1-190; various sizes, from stock.—J. Gerber & Co., Ltd., Wembley. 2300

A.R.P. Shelter Ventilating Units, 750 cu. ft., with A.C. 230/1/50 motors, unused (5). Surplus stock.—Box 2297, c/o The Electrical Review.

BEST English Cables, all standard sizes 1/.044 up to 127/.103, good deliveries against Government contract number.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 8021

BRAND new Alternators, 440/3/50, 4-wire, 1,000 revs., with exciters, 50-60-80-100 kVA, for quick delivery. —J. Gerber & Co. Ltd., Wembley, Middlesex. 2298

COLD start Diesel Davey Paxman (1932), 25 H.P., 375 revs., 1 cyl., vert., with or without dynamo.—Box 2299, c/o The Electrical Review.

CONDUIT and Conduit Fittings. For prompt delivery, phone—Piggott, Sydenham 5035. 35

FLEXIBLE Cords and Cables of all sizes and types supplied from stock. State requirements.—Box 7971, c/o The Electrical Review.

FOR immediate disposal, 75-kVA, 6,600/420-volt, delta star indoor type "J. & P." Transformer. Also 25-kVA, outdoor type, pole-mounting Transformer, manufactured 1930. Low price accepted for immediate disposal. —Box 2267, c/o The Electrical Review.

FOR Sale, A.C./D.C. Motor Generating Set by Crompton; comprising 120-volts Dynamo, 2,335 amps.; shunt wound with interpoles; mounted on cast iron bedplate, and direct coupled to Auto-Synchronous Motor, wound for 2,000 volts, 2-phase, 50 cycles, which can be rewound for 400 volts, 3-phase; speed 600 r.p.m.; complete with control gear; first-class unit.—George Cohen, Sons & Co., Ltd., Wood Lane, London, W.12. 2274

FOR Sale, one four-compartment Sun-ray Tricity electric cooker, 100 volts, 100 amps., suitable for canteen.—Box 15, c/o The Electrical Review.

FOR Sale, standby Generating Sets, including 55-kW, 230-volt D.C. Ricardo, petrol.—Fyfe, Wilson & Co., Ltd., Bishop's Stortford. 2304

FOR Sale, 35-kW, 230-volt D.C. Dorman Crude Oil Set, 1,050 r.p.m., direct coupled with switchboard, new engine.—Box 2306, c/o The Electrical Review.

FOR Sale, 140-H.P., 440/3/50, 2,960-r.p.m. Squirrel Cage Motor and Starter, with or without alternator, 80 amps., 1,100 volts, 1,000 cycles, single-phase and exciter.—Fyfe, Wilson & Co., Ltd., Bishop's Stortford. 2305

FOR Sale, 850 yards L.T., 2-core, .0225-sq. in. P.I.L.S. and Taped 660-v. Cable. Circular conductors. Any offers to—Box 8014, c/o The Electrical Review.

FOUR 1,000-kVA, "Berry," single-phase, oil-immersed, self-cooled Transformers, but without oil, suitable for 50-cycle service and ratio 6,070/3,460 volts, with tappings on the high-pressure side at 5,925 and 5,780 volts. Arranged for Star-Star connection and fitted with tertiary winding. The transformers can be viewed by arrangement with the Borough Electrical Engineer, 18/24, Lower Clapton Road, London, E.5. 2229

KOHLER Sets, rebuilt, 1½ kW, 220 v.; 2 kW and 800 w., 110 v.; two 5-H.P. Vertical Oil Engines; several Diesels.—E. Binns, 156a, Falsgrave Rd., Scarborough. 8018

LARGE quantity single-core C.T.S. Flexible, braided finish, carry 24 amps., cheap.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 8022

LARGE quantity 10-amp. D.P. ironclad D. & S. Fuses, extra cheap.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 8023

LARGE quantity 16mm. and 11mm. solid and cored Arc Lamp Carbons, cheap.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 8024

LEAD-Covered and Armoured Cables, P.I. and V.I.R. various special lines at low prices.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 8025

LINESMEN'S Detectors, G.P.O. pattern, unused, cheap.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 8026

MONOMARK. Permanent conf. London address. Letters redirected. 5s. p.a. Write—BM/MONO53, W.C.1. 43

MOTOR Generator Sets and Convertors, all sizes and voltages from ½ kW up to 500 kW in stock.—Britannia Manufacturing Co., Ltd., 22/26, Britannia Walk, City Road, London, N.1. Telephone, Clerkenwell 5512, 5513 and 5514. 28

NAMEPLATES, Engraving, Diesinking, Stencils, Steel punches.—Stilwell & Sons, Ltd., 153, Far Gosford Street, Coventry. 14

NATIONAL Gas Engine, bore 9" × stroke 17", developing 22 B.H.P. at 250 r.p.m., driving direct through a coupling a "Siemens" Dynamo, type 270F.C., kW 0/15, amps. 65, revs. 250/265, volts 230/250. Field Comp. together with Exhaust Piping, 3 Cooling Water Tanks and Switchboard.—W. S. Tafner, 13-15, Elliot St., Liverpool, 1. 2301

NEWMAN Industries, Ltd., Yate, Bristol, for electrical plant of all kinds. Newman Industries, Ltd., Yate, Bristol, for electrical plant of all kinds. Newman Industries, Ltd., Yate, Bristol. Tel. Chipping Sodbury 111. 25

PORCELAIN Insulators and Spindles, also Cleats, cheap.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 8027

REJAFIX Patented Marking and Printing Machines, as used in the execution of orders for Government Departments as M.A.P., M. of S., R.A.F., etc. Simple, efficient and economical. Speeds up production.—Rejafix, Ltd., 75, Baker Street, W.1. 40

ROTARY Converter, 125 kW, "L.D.M.," 6,000 v. A.C./230 v. D.C., 1,000 revs., with Switchgear.—Greenhalgh Bros., Burton's Field Mill, Atherton, M/cr. 2290

ROTARY Converters in stock, all sizes; enquiries invited.—Universal Electrical, 221, City Road, London, E.C.1. 16

SEARCHLIGHTS (sale or hire), Instruments and Resistance Wires, T.R.S. and other Cables, surplus Lamp Bulbs, Carbon Rods, Ebonite, Fibre, Erinoid, Porcelain House-wiring and other Cleats, Reels and Knobs, Mirrors, Lenses, etc.—London Electric Firm, Croydon. 2174

SINGLE-phase, J. & P. Transformer, 20 kVA, 440/110 volts D.C., Switchboard and all accessories. Inspection invited.—Secretary, The Institute, Abertillery, Mon. Phone, Abertillery 202. 2308

SPECIAL Offer, 37/.064 Twin C.T.S. Cable, 300-yard lengths; also quantity 7/.044 and 7/.064 single ditto.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 8028

STAFF Time Checking and Job Costing Time Recorders (all makes) for quick cash sale. Exceptional condition. Write—Box 528, Smiths, 100, Fleet Street, London, E.C.4. 31

STORAGE Battery Plates. 10 ton of plates in positive and negative groups, new, various useful sizes. Cheap to clear.—Adler, The Butts, Rochdale. 2285

THREE 150-kVA. B.E.T. Transformers. Two 250-kVA. Westinghouse Transformers, offered at scrap prices. Apply—Newman Industries Limited, Yate, Bristol. 2310

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500 Electric Motors, Dynamos, Transformers, Converters, etc., etc. at low prices.—S. C. Bilsby, A.M.I.C.E., A.M.I.E.E., Crosswell Road, Langley, near Birmingham. Phone, Broadwell 1359. 21

1,000-kW Motor Generator Plant for sale, 6,600/3/50 c. input, 460 D.C. output, 3-wire. —Universal, 221, City Road, London, E.C.1. 29

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2302

COMPANY MEETINGS

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD.

THE 63rd ordinary general meeting of the above was held yesterday in London, Sir Montague Hughman (chairman of the Company) presiding.

The Chairman, in moving the adoption of the report, said:

I stated that the year was one of the most difficult in the Company's history, notwithstanding the fact that we were over one hundred years old. These remarks may very well be applied to the year 1941, when the problems of carrying on in war-time were, if anything, accentuated. The constant changes in staff and workpeople have made it a strenuous year for all those working for the Company.

I am glad to be able to report satisfactory progress in the Company's business during 1941, when our turnover again reached record figures. The percentage of profit earned showed quite an appreciable reduction, and as all our work is in connection with national requirements, I do not think that any of you will grumble at the fact that in a year of record turnover we have not maintained the former rate of profit.

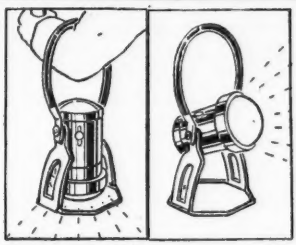
Though the parent Company and its subsidiaries (all of which made profits) have carried out a very large increase in business, you will see from the balance-sheet that the balance on trading account is only slightly better than in 1940, and I trust the stockholders will feel satisfied with the results of our labours.

An interesting feature which the Company has brought into operation is the formation of a works council at each of our works. Such councils are intended to provide a ready means of joint consultation between the employer and employee on matters of mutual interest, with the idea of securing the fullest co-operation, efficiency, comfortable working conditions, and other amenities within the Company. The workpeople elect their own representatives to serve on the council, and sitting with them are certain representatives appointed by the Company. Although our councils have only been in operation for a comparatively short time, I think I can safely say they are proving very successful and helpful to both the Company and the workpeople alike.

The balance on trading account is £410,645, which is approximately £10,000 higher than in 1940, and this balance has been struck after charging our liability for taxation. The business of our overseas branches has suffered during 1941 owing to the restriction upon exports, but as the branches had ample stocks in hand at the beginning of the year the reduction in the turnover is less severe than might have been expected and the profits satisfactory. We have always been very proud of our overseas trade, and in 1940 this was over 28 per cent of our total business. In 1941 this was reduced to 25.3 per cent, and with the extension of the war we must expect a lower percentage for the future. The profits earned are very much reduced by taxation in the overseas countries as well as at home, although some measure of relief is obtainable in respect of double taxation.

The results of the trading of our subsidiary companies for the year have been satisfactory. The tyre company had a very busy year, with a record output of tyres and other rubber manufactures, and this reflects great credit on all concerned, especially as costs of manufacture have shown substantial economies.

I feel satisfied that the work we have done has been appreciated by the Government, and I have been supported in this great work in a generous way by all those working under me. 2311



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